75

See p 129

MINING AND MINING INVESTMENTS

MINING AND MINING INVESTMENTS

BY

A. MOIL

WITH DIAGRAMS AND PLANS

METHUEN & CO.
36 ESSEX STREET W.C.
LONDON
1904

INTRODUCTION

THIS being a small book on a [illegible]

ERRATUM

Page 51, line 19, "1,500 feet by 300 feet" should read "not exceeding 1,500 feet by 600 feet."

Mining and Mining Investments.

are entirely ignored. One chapter is devoted to showing the magnitude of the interests still involved after excluding coal and iron; and because these last are usually considered more as commercial undertakings than mining risks, so investments in them have been put in a different category from that in which it used to be the custom to include the speculation in mines of gold, silver, tin, copper, lead, etc. The time has passed, however, when investment in mines,

INTRODUCTION

THIS being a small book on a very large subject, it is reasonable to give some explanation of the objects in view in its publication, and of the principle followed in its condensation.

The mining industry, as a whole, has been of such vast importance to Great Britain, and so much of the commercial position of the Empire is directly or indirectly connected with it, that no one will dispute the claims to consideration of the subject. But by many the greater part of this importance will be attributed to coal and iron mining; and in the following pages these two branches of the industry are entirely ignored. One chapter is devoted to showing the magnitude of the interests still involved after excluding coal and iron; and because these last are usually considered more as commercial undertakings than mining risks, so investments in them have been put in a different category from that in which it used to be the custom to include the speculation in mines of gold, silver, tin, copper, lead, etc. The time has passed, however, when investment in mines, or in the shares of mining companies, was not considered quite respectable for a serious business man. Now many of the capitalists of the world, and a very large and increasing number of the public of limited means, are interested in metalliferous mining.

It must be acknowledged that this growing interest in mining investment, or, if the term be preferred, mining speculation, has been accompanied by great abuses and consequent evils. The natural uncertainties of mining are sufficiently great, but a very large proportion of the public losses in share dealings has arisen from risks not by any means peculiar to mining. The history of public company promoting in connection with mining is full of striking instances of ignorance, fraud, and wild extravagance, which have all led to the unnecessary loss of millions of money; and one of the chief objects of this book is to give some warnings to those who do not have the experience or sources of information necessary to avoid the most palpable dangers.

There is no pretension here of writing a guide to safe investment in mines; but there is no doubt that the observance of some few safe general rules, which are within the comprehension of the uninitiated, would greatly reduce the losses of the public, and still leave ample margin of fair speculative risk.

The great prizes continually recurring in mining, and the increasing difficulty of obtaining a good rate of interest on small sums, must hereafter, as in the past, make mining shares attractive to great numbers; and it is very good for the Empire that capital should be forthcoming to take risks in developing the mineral wealth of the whole world.

Since the natural result of investment in shares is that the investor receives and reads mining reports, it has been considered desirable to devote a few chapters to the technical subjects of mining, and ore treatment; but in a very condensed and popular form, and simply as a help to the understanding of information coming from the mines.

CONTENTS

MINING AND MINING INVESTMENTS

CHAPTER I

A LITTLE ANCIENT HISTORY

IN many mining countries there are extensive remains of ancient workings; and while some of these are within the well-defined historical period, others are of absolutely unknown age, carried out by races of which no accurate record exists. These ancient mines are often of value at the present day as affording guides to exploration, and in many cases we are still working profitably in depth the very mines which in unknown ages before were worked from the surface. In India the old mines were found to go down several hundred feet, and to be of great extent along the course of the veins. In some cases the surface pits have proved the guides to large and profitable mines, opened below them; and in other cases very extensive ancient workings are over ground which is not payable at the present day. Hasty conclusions of the value of ancient workings as indications are not infrequent, but consideration of the facts will show this must be so. There is no doubt that in ancient times the conditions as to employment of labour were essentially different from those of the present day, for generally slaves would be used; and in any case the cost would be little more than the mere support of existence of the workers, while the market for the final metallic product was equally distinct in its elements from the market of to-day.

As explained in the chapter on the occurrence of ores, the irregularity in the distribution of values makes it quite uncertain that a mine which is profitable to work at the surface will also be payable in depth; and a very long list could be made both of individual mines and of whole mining districts wherein experience has demonstrated, by continuous work in recent times, that increasing poverty accompanied increasing depth. From this it must be clear that even if the ancient mines were profitable to the ancient miners, it does not follow that the reopening and extending of their workings will result in dividends to the moderns. Again, it is not at all certain that all ancient mines were in a modern sense profitable, even under ancient conditions of working, since it is unnecessary to suppose the old miners possessed a special sense of divination; but, on the contrary, it is more reasonable to suppose they did a great deal of groping in the dark, as their successors do still, and that occasional successes encouraged many failures in the same neighbourhood. Broadly considered, the importance of ancient workings as indications consists in the pretty certain fact that some surface values had existed: and continuance of such values in depth is always possible.

The mining in historical times is in itself quite ancient enough to have a special interest of its own, but it can only be lightly touched on from its very magnitude; some few figures of interest will be found in Appendix A. Throughout Europe most extensive workings are found which are known to be of Roman origin, or under Roman rule. These mines were for various metals—mostly gold, silver, copper, lead, and tin; and the signs of great smelting operations are seen in the vast slag and cinder heaps at many places. The following quotation from Pliny (about A.D. 50), which lately appeared in the *Engineering and Mining Journal of New York*, among other mining news of more modern date, is interesting as showing the great variety and importance of some of the operations in gold mining at an early period :—

"PLINY ON GOLD MINING.*

"Gold is found in our part of the world, not to mention the gold extracted from the earth in India by the ants, and in Scythia by the griffins. Among us it is procured in three different ways; the first of which is in the shape of

* Plinius Secundus, *Historia Naturalis*, lib. xxxiii. chap. 21.

dust, found in running streams, the Tagus in Spain, for instance, the Padus in Italy, the Hebrus in Thracia, the Pactolus in Asia, and the Ganges in India. Indeed, there is no gold found in a more perfect state than this, thoroughly polished as it is by the continual attrition of the current.

"A second mode of obtaining gold is by sinking shafts or seeking it among the débris of the mountains, both of which methods it will be well to describe. The persons in search of gold in the first place remove the 'segutilum,' such being the name of the earth which gives indication of the presence of gold. This done, a bed is made, the sand of which is washed, and according to the residue found after washing, a conjecture is formed as to the richness of the vein. Sometimes, indeed, gold is found at once in the surface earth, a success, however, but rarely experienced. Recently, for instance, in the reign of Nero, a vein was discovered in Dalmatia, which yielded daily as much as fifty pound weight of gold. The gold that is thus found in the surface crust is known as 'talutium,' in cases where there is auriferous earth beneath. The mountains of Spain, in other respects arid and sterile, and productive of nothing whatever, are thus constrained by man to be fertile, in supplying him with this precious commodity.

"The gold that is extracted from shafts is known by some persons as 'canalicium,' and by others 'canaliense.' It is found adhering to the gritty crust of marble, and altogether different from the form in which it sparkles in the sapphirus of the East, and in the stone of Thebaïs and other gems it is seen interlaced with the molecules of the marble. The channels of these veins are found running in various directions along the sides of the shafts, and hence the name of the gold they yield, 'canalicium.' In these shafts, too, the superincumbent earth is kept from falling in by means of wooden pillars. The substance that is extracted is first broken up and then washed, after which it is subjected to the action of fire and ground to a fine powder. This powder is known as 'apitascudes,' while the silver which becomes disengaged in the furnace has the name of 'sudor' given to it. The impurities that escape by the chimney, as in the case of all other metals, are known by the name of 'scoria.' In the case of gold, this scoria is broken up a second time and melted over again. The crucibles used for this purpose are made of 'tasconium,' a white earth similar to potter's clay in appearance, there being no other substance capable of withstanding the strong current of air, the action of the fire, and the intense heat of the melted metal.

"The third method of obtaining gold surpasses the labours of the giants even. By the aid of galleries driven to a long distance, mountains are excavated by the light of torches, the duration of which forms the set times for work, the workmen never seeing the light of day for many months together. These mines are known as 'arrugiae,' and not unfrequently the clefts are formed on a sudden, the earth sinks in, and the workmen are crushed beneath; so that it would really appear less rash to go in search of pearls and purples at the bottom of the sea, so much more dangerous to ourselves have we made the earth than the water. Hence it is that in this kind of mining, arches are left at frequent intervals for the purpose of supporting the weight of the mountain above. In mining either by shaft or by gallery, barriers of silex are met with, which have to be driven asunder by the aid of fire and vinegar, or more frequently, as this method fills the galleries with suffocating vapors and smoke, to be broken to pieces with bruising machines shod with pieces of iron weighing 150 pounds; which done, the fragments are carried out on the men's shoulders, night and day, each man passing them on to his neighbour in the dark, it being only those at the pit's mouth that ever see light. In cases where the bed of silex appears too thick to admit of being penetrated, the miner traces along the sides of it, and so turns. And yet, after all, the labour entailed by this silex is looked upon as comparatively easy, there being an earth—a kind of potter's clay mixed with gravel—'gangadia' by name, which is almost impossible to overcome. This earth has to be attacked with iron wedges and hammers, like those previously mentioned, and it is generally considered that there is nothing more stubborn in existence—except, indeed, the greed for gold, which is the most stubborn of all things.

"When these operations are completed, beginning at the last, they cut away the wooden pillars at the point where they support the roof. The coming downfall gives warning, which is instantly perceived by the sentinel, and by him only, who is set to watch upon a peak of the same mountain. By voice, as well as by signals, he orders the workmen to be immediately removed from their labours, and at the same moment takes flight himself. The mountain, rent to pieces, is cleft asunder, hurling its débris to a distance with a crash which it is impossible for the human imagination to conceive; and from the midst of a cloud of dust, of a density quite incredible, the victorious miners gaze upon this downfall of nature. Nor yet even then are they sure of gold, nor, indeed, were they by any means certain that there was any to be found when they first began to excavate, it being quite sufficient, as an inducement to undergo such perils and to incur such vast expense, to entertain the hope that they will obtain what they so eagerly desire.

"Another labour, too, quite equal to this, and one which entails even greater expense, is that of bringing rivers from the more elevated mountain heights—a distance, in many instances, of 100 miles perhaps—for the purpose of washing the débris. The channels thus formed are called 'corrugi,' from our word 'corrivatio,' I suppose; and even when these are once made they entail a thousand fresh labours. The fall, for instance, must be steep, that the water may be precipitated, so to say, rather than flow; and it is in this manner that it is brought from the most elevated points. Then, too, the valleys and crevasses have to be united by the aid of aqueducts, and in another place impassable rocks have to be hewn away and forced to make room for hollowed troughs of wood, the persons hewing them hanging suspended all the time with ropes, so that to a spectator who views the operations from a distance the workmen have all the appearance not so much of wild beasts as of birds upon the wing. Hanging thus suspended, in most instances, they take the levels, and trace with lines the course the water is to take; and thus, where there is no room even for a man to plant a footstep, are rivers traced out by the hand of man.

"The water, too, is considered in an unfit state for washing if the current of the river carries any mud along with it. The kind of earth that yields this mud is known as 'urium,' and hence it is that in tracing out these channels, they carry the water over beds of silex or pebbles, and carefully avoid this urium. When they have reached the head of the fall, at the very brow of the mountain, reservoirs are hollowed out a couple of hundred feet in length and breadth and some ten feet in depth. In the reservoirs there are generally five sluices left, about three feet square; so that the moment the reservoir is filled the flood-gates are struck away, and the torrent bursts forth with such a degree of violence as to roll onward any fragments of rock which may obstruct its passage.

"When they have reached the level ground, too, there is still another labour that awaits them. Trenches—known as 'agogoe'—have to be dug for the passage of water; and these, at regular intervals, have a layer of ulex placed at the bottom.

"This ulex is a plant like rosemary in appearance, rough and prickly, and well adapted for arresting any pieces of gold that may be carried along. The sides, too, are closed in with planks and are supported by arches when carried over steep and precipitous spots. The earth, carried onward in the stream, arrives at the sea at last, and thus is the shattered mountain washed away—causes which have greatly tended to extend the shores of Spain by these encroachments upon the deep. It is also by the agency of canals of this description that the material, excavated at the cost of such immense labour by the process previously described, is washed and carried away, for otherwise the shafts would soon be choked up by it.

"The gold found by excavating with galleries does not require to be melted, but is pure gold at once. In these excavations, too, it is found in lumps, as also in the shafts which are sunk, sometimes exceeding ten pounds even. The names given these lumps are 'palagae' and 'palacurnae,' while the gold found in small grains is known as 'baluce.' The ulex that is used for the above purpose is dried and burnt, after which the ashes of it are washed upon a bed of grassy turf, in order that the gold may be deposited thereupon."

It must be admitted that, while some of the operations are clearly recognisable as the close equivalent of branches of modern mining and ore reduction, the writer has evidently become a little confused in his description of others. This is certainly not to be wondered at, and is no more marked than in some attempts of journalists of to-day to instruct the public on modern mines and methods of working.

CHAPTER II

THE IMPORTANCE OF THE INDUSTRY

THE importance of coal and iron mining is questioned by no one; but there are many estimable persons who would never think of doubting the legitimacy of investment in, and money-making from, these two branches, yet who have a rooted distrust and dislike of those lucky enough to make fortunes out of other classes of mining. Hence it has come about that the title of mining magnate, as indicating such a fortunate person, is used by some as a term of opprobrium. It is, however, the mining of gold, silver, tin, copper, and lead which has been the chief incentive to the opening of new countries, and has led to the establishment of prosperous independent colonies. The wealth developed in this mining has in large measure returned to Great Britain in the form of fortunes to be spent and invested here; or through the enormous development of exports of all kinds necessary for the mining industry itself, and for the wants and luxuries of the large populations attracted or made possible by its great results. All the moving of population from the older overcrowded countries or districts could never have been accomplished by simple agricultural and manufacturing pursuits, as these in most cases follow the openings made by mining. The western portion of the United States is a striking illustration of the pioneer work of, and continuous prosperity flowing from, metalliferous mining; and it seems hardly necessary to point to the history of Australasia and South Africa as other examples. The present metal production of the United States alone, exclusive of iron and steel, is of the annual value of about £45,000,000; and including all products of mining operations, it is about £220,000,000.

What the extent of the industry is at present can be shown by a few figures of the annual production of the metals most interesting to the public. In round figures the sterling values of these metals produced all over the world, and the proportions produced from the British Empire, are as follows:—

VALUE OF ANNUAL PRODUCTION

	World's Production.	British Empire.
	£	£
Gold	69,680,000	40,076,000
Silver	17,624,000	1,535,000
Copper	30,000,000	3,058,000
Lead	10,290,000	1,898,000
Tin	11,350,000	7,370,000
Zinc	10,143,000	748,000
Diamonds	7,500,000	6,500,000
Quicksilver	1,053,000	—
Nickel	2,394,900	1,319,000
Platinum	921,000	—
Totals	160,955,900	62,504,000

NOTE.—The gold production taken includes the Transvaal at the figure reached before the war.

Not only are these figures sufficient to demonstrate the magnitude of the interests involved, but the proportion credited to the Empire almost justifies, and does explain, even the exaggerated and ill-directed speculations of the times of mining excitement by the British public. In other chapters an attempt is made to point out some of the unnecessary risks which the ordinary investor runs in times of excitement (and he usually only invests at such times), and it is very largely these unnecessary risks which have given mining so bad a name with prudent people. Some mines are such successes from their earliest discovery that they furnish profits on the first working without any capital worth mentioning being put into them; and they pay out of earnings for progressive development in the scale of working, until they become great producers and great profit earners. But for one such mine there are dozens of others which, though eventually profitable, require in their earlier stages a varying amount of working capital, and often a very large sum is necessary to open them up, establish their character, and properly equip them with plant before profits can be earned. The success of the few phenomenal mines encourages the investment of capital in the more numerous cases wherein chances must be taken; and unless capital were obtainable for work of this character whole districts would remain unworked, and a vast industry, with its many blessings, would dwindle to small dimensions. The aggregate results, and the benefits direct and indirect to the Empire, fully warrant what may be called the legitimate speculation on the chances above referred to. When periods of mining excitement are followed by the usual reaction and a counting of individual losses, there are plenty ready to deliver sermons on the text of the evils of speculation; but, if it were possible to eliminate, or even materially to reduce the sources of the risks which are in no way essential to the mining industry, the remaining necessary risks are, on the whole, fully justified by the profits and advantages above referred to. Therefore it seems absolutely proper that attempts should be rather in the direction of guiding speculation than of discouraging it altogether. It is often said that in the case of gold mining the total expenditure exceeds the receipts, if all the failures are included with the costs of all the producing mines. Even if this be so—and without considering what proportion of the losses may come under the head of unnecessary risks—the ultimate gain to the world is a great one; for the expenditures are by no means all total loss, and the gold is a permanent gain with its potentialities of future commercial good. People likely to speculate in mines are unlikely to occupy themselves greatly with moral reflections as to the evils growing from gold considered as a root. The wider view of the total gains from mining is not, however, of a nature to afford much consolation to the individual investor who happens to have been interested among the failures and not in the successes of mining; but the large and rapid profits obtainable with success will always be incentive enough for many people to join in the business. What the prizes may be in mining can best be shown by taking the profits of merely a few of the great mines of the world from different countries; and the following list, while showing how vast these profits are, will also exhibit the wide distribution of successful mining over the earth.

DIVIDENDS PAID BY A FEW SELECTED MINES

Name of Mine.	Country.	Character.	Number of Years worked.	Amount of Dividends.
				£
Mount Morgan .	Australia	Gold	18	6,154,166
Great Boulder . .	,,	,,	9	1,484,925
Golden Horseshoe.	,,	,,	5	1,335,000
Waihi	,,	,,	11	1,327,420
El Callao . . .	Venezuela	,,	20	1,900,000
Homestake . . .	United States	,,	26	2,500,000
Mysore	India	,,	23	3,493,500
Champion Reef .	,,	,,	15	2,168,000
St. John del Rey .	Brazil	,,	61	1,748,400
Robinson . . .	South Africa	,,	15	3,520,000
Crown Reef. . .	,,	,,	16	1,450,000
Ferreira	,,	,,	13	1,404,000
Broken Hill Propy.	Australia	Silver-lead	—	9,960,000
Mount Bischoff .	,,	Tin	—	1,831,500
Huanchaca . . .	Chili	Silver	13	1,920,000
Rio Tinto . . .	Spain	Copper	30	12,200,000
Tharsis Sulphur .	,,	,,	21	5,050,000
Mount Lyell . .	Australia	,,	17	1,000,000
Cape Copper . .	South Africa	,,	15	1,900,000
Calumet and Hecla	United States	,,	34	16,600,000
Anaconda . . .	,,	,,	20	4,800,000
Quincy	,,	,,	35	2,900,000
United Verde . .	,,	,,	15	3,000,000
De Beers . . .	South Africa	Diamonds	32	18,394,000
Ontario Silver . .	United States	Silver	15	3,100,000
Silver King. . .	,,	Silver-lead	10	1,500,000

It would be possible to extend this list to a great length, and yet only include properties which have paid profits of over half a million sterling each; and a very formidable list of ancient mines could be given, the production of which is known to have been enormous, although the extent of the profits derived from them cannot even be guessed at. The above is, however, enough simply to illustrate the value of the prizes to be drawn; and therefore both to explain the attractiveness of mining and to guarantee a continuation hereafter of not only careful mining investment by the experienced, but of periodical speculative excitements by the inexperienced public.

There is another aspect of the question of the importance of the industry, which is obtained by considering the capitalisation of mining companies formed in the past.

The *Mining Journal of London* has been in the habit of publishing at the beginning of each year a summary of the registrations of companies for the preceding twelve months. Taking the figures of incorporation of new mining companies for the ten years from 1893 to 1902 inclusive, the following stupendous totals are reached:—

The total number of companies registered was 5,482, and their aggregate capitalisation was £582,915,449. Of these, 950 companies, capitalised at £56,234,626, were for operating in Great Britain, and were in most part connected with iron and coal mining; while the remaining companies were nearly all formed for mining other than iron and coal. Deducting the incorporations formed for British mining, there remain 4,532 companies for work abroad, with a capitalisation of £526,680,823. It will be admitted that this represents an industry of importance to the public and to the Empire, even allowing for abnormal activity in the ten years taken for illustration. Of course, these figures are entirely irrespective of the large sums invested in foreign and colonial mining companies, and the very large private investments in mines, which are not registered as companies.

To show the vast scale of operations in some successful mines, and the labour and outlay involved, as well as the importance of the product in trade and manufactures, the following figures from the history of the Rio Tinto mines of Spain are worth recording: During the twenty-seven years' work from 1876 to 1902 inclusive about 35,000,000 tons of ore were mined, which contained on the average about 2·8 per cent. of copper, equal to 980,000 tons of pure metal.

CHAPTER III

ALLUVIAL OR PLACER MINES

A LARGE proportion of the gold of the world, and nearly the whole of the platinum in existence, have come from what are known variously as alluvial, placer, or gravel deposits. The early work of gold mining in most gold countries has been confined to washing the grains of metal out of gravel-beds, or river sands, and even at the present day a very large yearly production is from these sources. There are a number of forms of the occurrence of gold-bearing gravels. Some deposits are of great surface extent and depth; others are of small width but great length, being evidently the beds of ancient rivers, which, in some cases, are buried under thick layers of solid rock deposited subsequently to their formation. The beds of existing rivers sometimes contain gold in payable quantity; and streams are occasionally turned from their courses to enable the gravel and sand to be worked over. With the buried river-beds, or "deep leads," as they are called, regular mining operations are necessary for the extraction of the gravel; and, as in other mining, shafts have to be sunk and levels driven as a means of getting the gravel to surface, if the contour of the country does not allow of running in an adit or tunnel from the surface, at a level below the bottom of the gravel deposit. In California and Australia these ancient river-beds have been worked for many years, and great wealth of gold has been extracted from them. With the exception of the "deep leads," involving, as they do, certain regular mining methods, the working of placer mines is usually very simple in operation, though requiring often great engineering skill in the preparation of the ground for working by the bringing in of water, and for the disposal of the tailings, or débris, after the gold is extracted. The gravel is shovelled or washed with a stream of water into a long sluice or wooden trough, in the bottom of which is fitted a bed of pebbles or blocks of wood, making an irregular surface with many interstices, into which the gold particles, by their greater weight, will settle and collect. Quicksilver is usually sprinkled along the sluice before washing begins, and helps to retain the gold and prevent its washing down the sluice with the gravel. At intervals the bottom of the sluice is taken up, and all the gold and gold amalgam are collected. The most economical method of placer mining is that in which a large stream of water can be brought from a height above in pipes, and used as a powerful jet against the face of the gravel bank, thus doing away with nearly all hand labour, and both breaking down and washing into the gold-saving sluice at one operation. This is called hydraulic mining. In some of the large Californian placer mines, great banks of gravel are thus worked so cheaply that a yield of 1½ pence in value of gold per cubic yard of gravel can be made to pay all expenses. The actual weight of gold corresponding to this value is less than one grain; and to obtain this a cubic yard of gravel weighing about 1⅓ tons has to be broken down and washed. Some gravel deposits are very rich, and the value runs chiefly in the form of a streak or "channel," where a process of natural concentration by running water has collected the particles of gold in relative abundance. For example, in the Klondike there are channels of pay ground running for long distances, in which the gravel has yielded from £3 to £20 in gold per cubic yard.

A method of working gold-bearing gravel which has been used with increasing success of late years is that of dredging. By means of dredging machinery carried on flat-bottomed vessels, the beds of existing streams or lakes can be worked; and the gravel and sand, after washing to recover the gold, can be either discharged into the water again or deposited on the banks. This system of working is not only applicable to streams and lakes on which the dredge can be floated, but it can also be used on flat gravel plains, either by using a dredge which is movable on the ground, or by making an excavation which is filled with water for floating the dredge. In this latter case the dredge, as it advances and extends the artificial pond in one direction, discharges the washed gravel at the back on to the ground already worked over. Such arrangement allows of the working of large quantities of gravel with a very moderate supply of water; and this, too, in places which from their flatness could not be profitably worked otherwise. At one place in California which has been worked over, both by white men and Chinese, since the early days of the gold excitement fifty years ago, and where, within an area of 150 square miles, at least £16,000,000 worth of placer gold has been extracted from the richer channels workable on a small scale, the poorer gravel-beds in a position unfavourable for hydraulic mining are now worked most successfully with dredges. In one small area over twenty dredges are at work; and, according to a paper lately read before the Institution of Mining and Metallurgy, these dredges handle from 1,200 to 2,000 cubic yards of gravel per day at a cost of from 2½*d.* to 4*d.* per cubic yard, while the yield is about 9*d.* in gold per yard. The gravel is about thirty-three feet in depth, which gives 53,240 cubic yards to the acre; so that, allowing for stoppages and delays, a dredge will work out one acre per month.

The cost of a dredge of the pattern and capacity in use is about £13,000; and therefore the owners of ground, with the expenditure of only the small capital of, say, £15,000, can establish a most profitable business.

Dredging has been used for several years in New Zealand and other parts of Australasia—it is being introduced into West Africa and many other mining countries—and from its simplicity, economy, and application to conditions which prohibit successful hand or hydraulic working, it is certain in the future to have a great expansion. Usually it is resorted to by individuals or syndicates of a few men with limited capital, but there is no reason why it should not be the basis of most profitable operation for companies with ample capital to secure large areas of paying ground, and to establish a sufficient number of dredges to work on a scale commensurate with the investment.

As in all mining, the chief risk comes in the selection of the ground to be purchased; but the valuation of gravel-beds is generally more easily effected than with veins or other underground deposits. Pits or special drill-holes can usually be sunk, and in sufficient number to reduce the risk of errors to a reasonable point; but, as in all other mine valuations, many precautions have to be taken to avoid not only errors in sampling and in judgment, but also at times to keep clear of fraud. In Appendix B will be found a paper read before the Institution of Mining and Metallurgy, which gives some interesting information as to the "salting" of mines and as to the unreliable nature of some classes of mining reports.

CHAPTER IV

THE WORK OF MINING

THE operation of extracting the ore from the earth is performed either by open workings (quarrying) or by underground workings; and as the former is seldom possible in metalliferous mining, and is of a comparatively simple and easily understood nature, it is unnecessary to describe it here.

Underground work is started and carried out by means of either tunnels (adits) or shafts; and the shafts are either vertical or inclined, according to circumstances. When the ore occurs in a hill, within reasonable distance from its surface slope, a tunnel can be driven in horizontally to tap the ore; and this method of opening has natural advantages over sinking a shaft, by reason of its dispensing with the expense of equipment of the latter, and by avoiding the cost of working machinery to hoist the ore and water to surface. The mining term "adit" is used for any tunnel which runs from the surface to underground workings, and so gives access to them, and will drain water from them. In some cases a mine may be opened at first by one or more tunnels, and later developments are carried out by shafts for increasing depths to which tunnels cannot be driven from surface.

In Plate I. a diagram is given to illustrate the different workings of a mine, and will make the description of the terms used in mining more easily understood.

For the general purpose of explanation, it may be said that a mine is opened for work by running a series of underground tunnels or "levels" in the ore, usually about 100 feet apart in depth, and connecting them at intervals by small shafts, called "winzes" when sunk from one level to a lower one, and "upraises," "raises," or "rises," when worked upwards from a lower level to one above it. The various levels (if not adit tunnels running directly to surface) are connected with one or more shafts from surface, through which all ore and water are raised. A mine thus opened is said to be more or less developed, according to the extent of the workings, and to have more or less ore "blocked out," or "opened up," or "in sight," ready for breaking down and taking to surface. The use of at least two shafts from surface, and of a number of winzes between the various levels, insures a proper ventilation of the mine; and is a precaution in case of fire, inrush of water, or other accident to which mining is subject. In the driving of levels and in sinking shafts and winzes, a certain quantity of ore is necessarily taken out when the development work is in the ore body itself; but for regular extraction of the ore on a large scale the operation of "stoping" follows that of development. The term "stope," signifying step, is used to describe the portion of the ore which is being broken out between two levels; and "stoping" is the operation itself. Stopes are either "underhand" or "overhand," according to whether the miner works downwards or upwards. In both cases the ore falls, or is shovelled down, to the level below the stopes, where it is delivered by "chutes" or "passes" to small cars, which convey it to the shaft for hoisting to surface.

Sometimes short "drifts" or levels are run from shafts or winzes between the permanent levels, and these are described as "intermediate levels." "Cross-cuts" are drifts run from or to the main workings, to one side or the other. Shafts are often sunk vertically while the vein to be worked is inclined; or they may be sunk at an inclination, but not in the vein itself; and in these cases cross-cuts are run from the shaft at each level to connect with the latter. It is not unusual for a vein to "branch" (see Plate I.), and in this case cross-cuts are driven from the level which follows one branch to explore for and connect with the other branch. Occasionally a branch vein rejoins the main vein, and the mass of waste rock thus enclosed is called a "horse"; the same term being also used for smaller masses of waste rock within the vein body. The "country rock" is the solid rock in which the ore bodies or veins occur; and sometimes it is of different character on the two sides of the ore; for example, it may be granite on one side and slate on the other, if the ore has been deposited along a line of junction of these two rocks. As ore bodies and veins do not occur exactly vertical, there is an upper and a lower boundary, or wall, of enclosing rock; these are called respectively the "hanging wall," and "foot wall" (see Plate I.).

As work progresses it is usually necessary to employ timber for supporting the walls of the vein when this is extracted; and also for supporting the floor of levels when the ground is broken from under it; and in making a roof to the levels as the ground is stoped out above it. With veins of ordinary width the timbering is usually by props between the walls, called "stulls," or stull timbers, on which other timbers are laid; and wherever possible, waste rock occurring with the ore is left on these timbers, both as additional support to the walls, and to save unnecessary handling and hoisting of worthless material. In some cases rock is broken at surface and sent down into the mine to save timber in supporting the walls; and the waste or tailings from mills is occasionally run underground for the same purpose.

As a rule, mines start with very little capital, and their development usually is not systematic with a view to the future, but is guided by circumstances and the necessity for getting out the best ore with the least expense. Later, when the mines have proved worthy of larger outlay, new shafts and levels often have to be planned and carried out for economical working. In the earlier work the shafts may be small and ill-equipped, and the cost of sinking per foot very low; but permanent workings for handling a large capacity of ore are expensive. In South Africa—where the wonderful regularity of the gold reefs diminishes the risks of mining so much as to justify the raising of a very large working capital for the first opening of a property—shafts of large size are sunk to a great depth, and hundreds of feet of levels are driven before any ore is extracted. These shafts are frequently as large as 30 feet by 6½ feet, and divided by timber work into five compartments, of which two may be for hoisting ore, one for pumping and ladder-way, and two for hoisting and lowering of miners. Such shafts have been sunk as rapidly as 300 feet per month, but a more usual rate is from 100 to 200 feet. The cost of sinking and timbering such a shaft varies with the nature of the rock and other local conditions, but can be taken approximately at between £15 and £20 per foot in depth in the Transvaal.

As most mining is in hard rock, the work of sinking, driving, and stoping usually requires the use of explosives, such as black powder or some form of dynamite, and the operation is described as "blasting." Holes are drilled in the rock faces either by hand or by machine drills, and in these holes are placed the cartridges of the explosive with a fuse or with electric wires for its ignition. Hand drilling may be either "single-handed" or "double-handed." With the former a miner holds the drill and turns it with one hand, and strikes it with a hammer in the other hand. In double-handed drilling, which is the more usual, one miner holds and turns the drill, and another man strikes with a heavy hammer. Machine drilling is much more rapid than hand work, and the drills are run by means of compressed air, which is carried down into the mine by pipes from a compressor engine on the surface. The compressed air thus carried to the working faces is of great value in ventilating the mine, and enables work to be done under conditions which would render labour impossible except by its aid. Electrically driven drills have been employed; but difficulties connected with their construction, and the indirect advantages of compressed air underground, have combined to maintain the supremacy of air drills.

Mining reports are often accompanied by sections and plans of the workings, which to the uninitiated are often of no service, and a few words on the usual system adopted will make them a little more intelligible. In Plate I. will be found what is called a longitudinal section through a vein opened by two vertical shafts and several levels. Such a section assumes that the earth is transparent, and that the observer is looking at the vein from one side. Below this section is given a plan of the mine, which assumes that the observer is looking from the surface down into the transparent earth. To the left a transverse section is shown, which is a cut across the vein at right angles to the longitudinal section, and at the point where one shaft is sunk. The two sections are usually simple enough to understand; but the plan of a large mine is often a bewildering mass of lines requiring some study, even when the principle of their arrangement is understood. The complication largely arises from the fact that veins and ore bodies vary in width, in "dip" (or inclination), and in direction at different levels; so that on the assumption of looking down vertically from above the lines representing the workings necessarily overlap and cross in a somewhat confusing manner. A comparatively simple case is assumed in the plan given for purposes of illustration, wherein the adit level and first level appear normal in course; but the second and third levels show variations which result in the crossing of lines. It is usual in such mine plans to colour the different levels distinctively for facilitating their separation by the eye.

As a means of prospecting the ground, ahead of proper developments by shafts and levels, the use of a diamond drill is now frequently adopted. The drill consists of 10-feet lengths of steel piping, at the end of which is what is known as the "diamond bit." This consists of several diamonds set around and in the steel edge of the pipe; and the pipe is arranged to revolve rapidly by a small steam engine, and to move forward as fast as the diamonds grind the rock out in their circular path assisted by a stream of water pumped down the pipe. This arrangement of the diamonds around the hollow pipe leaves a centre or "core" of the solid rock passed through within the pipe; and special teeth inside the pipe grip this core when the pipes are hoisted up, breaking it off at the bottom and carrying it up with the pipe, as a perfect section of the rock passed through, similar to the taking out of a sample of cheese for tasting purposes. The size of core usually taken out is between one and two inches in diameter. Successive lengths of the steel piping are screwed on as the hole becomes deeper, and drilling can thus be carried on to a depth of a mile if required. The diamonds employed are not of the kind used for ornamental purposes; but are black in colour, and look more like a hard cinder than a precious stone. Yet they are true diamonds in composition, and owing to their scarcity they have become, solely for use in diamond drilling, more expensive in their rough state than good uncut stones of the well-known kind. A drill of average size, making a core of rock about $1\frac{1}{2}$ inches in diameter, will need, say, eight stones of an average of two carats each, or a total of sixteen carats; and these are worth at present about £160 in all. The diamonds will last a long time, barring accidents or carelessness, if they are properly set into the steel and do not get loose; but their cost enters materially into the expense per foot of hole drilled. The rate of drilling varies greatly with the rock passed through and with the depth of hole, running generally between ten and twenty-five feet per working day. Much time is taken up in the raising and lowering of rods in the case of a deep hole. The cost of putting a hole down will naturally vary greatly with the speed of sinking, and may be taken for ordinary depths at between 15*s*. and 30*s*. per foot, but reaching 50*s*. per foot in deep holes under unfavourable conditions. The following details of one week's actual work with a diamond drill, which had attained a depth of 4,400 feet, will show how the time was occupied and the rate of progress:—

Total hours actual boring	66
„ „ raising and lowering	48
„ „ ordinary delays	24
„ „ extraordinary delay	30
„ „ possible for week	168
„ depth bored for week	44 feet
„ length of core recovered	44 „
Number of lifts	4 —
Average length of core per lift	11 feet

This is an instance of very slow work, representing unfavourable conditions. Under favourable conditions, and with shallow holes, a speed of forty feet in twenty-four hours, at a cost of 8*s.* per foot, is obtainable.

The diamond drill is of great utility in some forms of mining; but as it is, after all, only a means of getting a very small sample out of the rock passed through; and as ore bodies are so very irregular in form and occurrence in most mines, it is not possible generally to use this cheaper and rapid substitute for the usual shaft sinking. In the case of the regular deposits of the Transvaal, the drill has been of the greatest service in proving the continuance of the reefs and their gold-bearing nature far below depths attained in the neighbouring mines, and so justifying the raising of large working capitals to open, by expensive shafts, the deeper level ground as distinct mines. The drill is often used underground for testing the country on each side of the regular workings; and in Western Australia important discoveries have been made of parallel veins or isolated ore bodies by its aid.

CHAPTER V

THE TREATMENT OF ORES

AFTER an ore is brought to surface it is always necessary to carry out something in the way of treatment before the marketable metal is produced; and as the question of treatment is naturally referred to in reports to shareholders, and in prospectuses, some explanation of the various processes used in ore reduction may be of interest.

As a preliminary to treatment, it is often desirable to do an amount of selection of richer ore from the poorer, or of rejecting from the ore such waste or barren rock as may be broken down unavoidably in mining. Sometimes this separation is only done roughly underground as the ore is handled, for the purpose of leaving the waste rock in the mine; and such operation is called "mine sorting." In cases where more careful separation is advisable, the work is done at surface, and is called "hand-picking" or "sorting." The ore is frequently broken first in a rock-breaker to pieces not larger than a fist; and this broken rock is conveyed slowly on a travelling belt or on a large revolving circular table, by which men stand and pick out by sight either waste or rich ore, as the case may be.

The various processes in general use are as follows: (A) Concentration, (B) Smelting, (C) Milling.

A. CONCENTRATION

This process is, in its nature, a preliminary and not a final treatment; since it is either a mechanical separation of two minerals requiring different treatment, or it is a separation of payable mineral from waste rock, which produces an enriched product for final reduction to metal. The process depends on the fact that all the minerals of the metals with which we are occupied are heavy compared with the waste rock in which they usually are found—that is, their specific gravity is greater. It is therefore possible, after crushing the ore, to treat it on certain mechanical devices known as concentrators; and, by the aid of water, to settle the heavier valuable particles away from the lighter and poorer material. The enriched product, known as "concentrates," is subsequently smelted, or otherwise treated, for the payable metals it contains; and the poorer product, known as "waste," "residues," or "tailings," is thrown away. In the absence of water it is possible, by dry concentration, to effect a similar separation by air to that usually accomplished by water; but there are objections to its employment which are sufficient to determine the use of the wet process whenever water for the purpose is obtainable.

In addition to apparatus for the use of water and air for separation of minerals, magnetic and electrical machines are used, to a limited extent, on some ores; and of late the peculiar selective action of a special oil has also been taken advantage of for the same purpose.

The ores usually subjected to concentration are those containing native metals, or metals combined with sulphur, when the mineral is known as a sulphide. The most notable exceptions are the occurrence of tin, which is usually found in combination with oxygen as an oxide, and some ores of lead and zinc.

The process of concentration is a cheap one, but requiring for its most perfect results a fairly complicated arrangement of machinery both for the crushing and washing; and this machinery must vary with the nature of the ore to be worked. The cost must depend largely on local conditions and on the size of the plant, and some illustrations will be found in the chapter on costs of treatment. Roughly it may be said that, putting aside exceptional cases of high expenses, the cost will vary between 1*s.* and 4*s.* per ton of ore crushed.

B. SMELTING

The various modifications of the smelting process are all carried out by the aid of fire, and require good chemical knowledge in their conduct to secure the greatest perfection of work. The ores usually treated by smelting are those in which the baser metals, copper, lead, zinc, and tin, occur, and not simply the precious metals; but as these latter often occur in the same ore with the former, they then come under treatment by smelting to lead or copper metal, with which they alloy, and from which a further separation or refining process is necessary. Sometimes the ores of gold and silver, although not alone adapted to a smelting process, are mixed with other ores of lead or copper occurring in their vicinity, and thus smelted with advantage. Smelting, except under distinctly favourable circumstances, is an expensive operation, owing to the consumption of fuel, and to the fact that the process is usually not simple, but multiple. For example, some ores require first roasting, then smelting, and finally, refining; all three subdivisions involving fuel consumption and labour costs. Furnaces must be kept in constant work with regular supply of ore of proper quality, in order to keep within a reasonable cost; and it is only the large plants, handling a great quantity of ore, which can show a cheap rate of treatment. In ordinary copper and lead smelting, one ton of good coke is required for every seven or eight tons of ore; and with a poorer quality of fuel a reduced quantity of ore is smelted per ton. Under the varying conditions which allow of the profitable adoption of the smelting process, it may be said, as a rough guide to the cost, that this will vary between 16*s.* and 50*s.* per ton of ore.

A modification of the smelting process, which has great advantages on certain ores, is known as "pyritic smelting," or as "raw sulphide smelting." In this process, ores which contain a great deal of sulphur in combination with iron and copper are smelted without previous roasting, and in such a manner that the sulphur, in burning off in the furnace, gives out so much heat as to thereby take the place of coke to a very large extent, and, in fact, the ore smelts itself. An illustration of a very successful application of this process is seen in the case of the Mount Lyell Copper Mine of Tasmania, where an enormous deposit of iron pyrites (or sulphide of iron), containing two to three per cent. of copper, is smelted with the addition of only one ton of coke to four hundred tons of ore; and the total cost of the smelting operation, with the subsequent refining of the copper "matte" produced into merchantable copper, is only 12*s.* 6*d.* per ton of original ore. Of this, the cost of refining by the Bessemer process is 1*s.* 3*d.* per ton of ore, or 72*s.* 6*d.* per ton of copper resulting. On other ores, not so well adapted to this pyritic smelting, it is found necessary to use one ton of coke to from twenty to thirty tons of ore; this, however, being still a great reduction in fuel consumption as compared with the ordinary smelting operation, in which no sulphur is utilised as fuel.

C. MILLING

Under this general head a number of operations are included, depending for their selection on the character of the ore, and on the working conditions which may decide in part the choice of a process.

Gold milling, in its simplest form, consists of the crushing of the rock first in rock-breakers, then stamping it with a stream of water in stamp batteries, and treating the flow of fine ore and water (called "pulp") for the extraction of the gold, by running it over inclined sheets of copper which have been coated on the surface with quicksilver. The metallic gold, or "free gold," as it is called, is retained by the quicksilver, with which it forms an amalgam; and this amalgam, scraped off the copper plates, is placed in a covered iron crucible to which a pipe is attached. This crucible, or "retort," as it is called, is then heated, to drive off the quicksilver, leaving the gold alone in the retort. The pipe of the retort through which the quicksilver is driven off, is cooled on the outside by water, which condenses the heated vapour into metallic form again, and thus recovers the quicksilver for further use.

Many gold ores, however, contain the metal not only in the "free" or metallic condition, but contained in (or even combined with) minerals of other metals, such as iron, copper, lead, zinc, in combination usually with sulphur. These gold-carrying minerals are not susceptible to treatment by simple running over quicksilvered copper plates, as above described; and they are usually separated from the waste rock by the process of concentration. Therefore when a gold ore is of the double character mentioned, it is first run over the copper plates to extract the free gold, and then treated by concentration to obtain the baser minerals carrying gold before separate treatment of these. The treatment of these sulphides or "concentrates" may be by smelting, or by roasting first and then chemical extraction. Occasionally they are roasted, and then ground up with quicksilver to extract the gold, which is freed from its combination with other substances by the roasting; but this process is not often advantageous.

The chemical processes in use for the extraction of gold are two, called respectively "chlorination" and "cyanidation," or cyaniding. In carrying out the chlorination process the ore must first be thoroughly roasted while in a finely powdered condition; it is then subjected to the action of chlorine gas, which forms a chloride of gold very readily soluble in water. The ore is then washed with water, which operation is called "leaching"; and the gold is afterwards precipitated from the solution by the addition of the necessary chemical reagent, falling as a brown powder, which is collected and melted into bars. This process, owing to the roasting and to the chemicals employed, is not a cheap method of treatment, and is therefore not used very extensively; but it is very efficient, and for certain ores and rich concentrates is alone possible where smelting is not cheaply carried on.

The most interesting case of the use of the chlorination process on a large scale is furnished by the Mount Morgan gold mine of Queensland. The ore of this mine used to be very rich, and for six years varied between 2 ozs. and 5 ozs. of gold per ton. After attempts to work it by every known process, the chlorination system was adopted, and is still used. At present about 22,000 tons of ore, of about 12 dwts., or 48*s.* per ton, are worked per month. The average total cost of ore treatment is about 13*s.* 6*d.* per ton. To give some idea of the magnitude of the chemical operations involved in this treatment, it may be mentioned that the yearly consumption of chemicals to produce the chlorine gas used for solution of the gold is about as follows:—

Manganese, 1,200 tons; salt, 1,330 tons; sulphuric acid, 3,400 tons.

The process of cyaniding is of comparatively recent introduction; but its applications are so many, and its operation so reasonable in cost, that it is now more universally employed than any other treatment for ores in which the gold is not readily obtained by simple amalgamation, or by amalgamation followed by concentration. It is, in fact, used in many cases, after both amalgamation and concentration, to effect an additional extraction on some ores. The process rests on the fact that gold, when in a finely divided state (as frequent in gold ores), is soluble in a weak solution of a chemical called cyanide of potassium. This chemical—which, by the way, is a strong poison—was a few years ago worth over 2*s.* per pound; but owing to improvements in manufacture to meet the constantly growing demands of the gold-mining industry, it is now obtainable at 10*d.* per pound. The powdered ore is put in large tanks or vats, and a weak solution of the cyanide is added, and left in contact for a varying number of hours until the gold is dissolved. The solution containing the metal is then run through boxes filled with fine zinc shavings, which precipitate the gold and leave the solution ready to be used over again on a fresh lot of ore. On many ores the fine crushing under stamps produces so much excessively fine material (which when in water is known as "slimes") that there is difficulty in forcing the cyanide solution through the crushed ore when settled in tanks; and it is customary to separate the slimes from the coarser ore particles (or "sand") and treat them separately. The special slimes treatment plants consist either of large conical tanks, in which the fine particles of ore settle or thicken after mixing with the cyanide solution, and the clear solution is drawn off at the top; this system is called washing by decantation; or the slimes and cyanide solution are pumped through filter presses, which retain the solid particles while the clear solution is discharged. The cost of cyaniding varies between 1*s.* and 3*s.* per ton of ore.

Milling, as applied to silver ores, differs from the usual treatment of gold ores. Silver ores are, after crushing, sometimes worked, with the addition of water to make a thick pulp, by amalgamation with quicksilver in amalgamation pans; and the quicksilver is distilled off from the amalgam of silver in retorts, as in the case of gold. Some ores are roasted before they are amalgamated, and others are first roasted and then treated in vats by certain chemical solutions, which dissolve out the silver in the same way that gold is taken out by the cyanide process.

CHAPTER VI

THE COST OF MINING

AS mining in itself is merely the extraction of ore from the earth, and has to be followed by extraction of metal from the ore, the working costs of any given mining business, except for comparative purposes, must cover all expenses up to marketing the final product.

Working costs must always vary greatly with local conditions of working, and the nature of the ore bodies. The great variety in the form of occurrence of ores is the subject of a special chapter. It is manifest that in countries where labour and transportation are cheap, and where wood and water are abundant, mining operations may be very cheaply carried on as compared with the costs in a district less favourably situated as to these items. No general rule can therefore be laid down about what costs should be; but it will be of interest to take a few examples from different countries, both to illustrate the differences, and to show the detailed items of the full cost of mining and treatment. In making up costs there is opportunity, of course, for good and bad systems of book-keeping; and mine managers are usually supposed to be as handy as any managers of commercial work in making a good show for the money expended. In a manufacturing works there are many items of outlay which cannot be charged directly to any given portion of the output, and some of which may be chargeable to capital, as improvement of works, instead of to revenue as part of the year's costs; so in mining the costs per ton of output may be increased or diminished according to the disposition which is made of certain annual or occasional charges. In the opinion of most people, however, there is this difference between a manufacturing business and a mine, that the latter, when it ceases to pay, is merely a worthless hole in the ground, with certain plant and machinery usually unsaleable or of little value; whereas the factory may be intrinsically worth its full book value if accounts have been fairly kept. It is therefore generally held that the accounts of a mine should be so kept as to charge everything possible to current revenue account, and to take as little as possible to the credit of capital account. There are mines and mines; so no system can be universally approved. Many coal and iron mines, some copper mines, and even a number of gold mines in South Africa and a very few outside, are so regular in value and of such ascertained extent, that the heavy expense of first opening and equipping them may very properly be spread over a series of years yet to come in the form of a charge per ton of output; thus gradually writing off the original total outlay charged to a capital account. In most cases of mining the expenditure for development and equipment is a gradual one, proceeding only as the mine by its output justifies; and as the life of the mine may be very uncertain, the whole expenditure of each year should be charged up before profits are calculated, *i.e.* each year should take care of itself, and the bank account should confirm the balance-sheet.

As illustrating the great cost of one portion of the mere preliminary development of a modern mine, the following figures, taken from the *Transactions of the Institution of Mining and Metallurgy*, of five months' work on a shaft in the Transvaal, may be of interest. During the five months a depth of 858 feet was sunk; and in one month the sinking reached 213½ feet, which is an exceptionally fine record of rapid work. This class of work has in the past usually been done much more deliberately, and even a few years ago a rate of 100 feet in depth per month was unusual.

Total cost, £11,835 19s. 5d.

	£ s. d.	Cost per ft. sunk. £ s. d.
White wages	3,292 16 0	3 16 9
Salaries	276 8 5	0 6 5
Native wages	1,190 4 8	1 7 9
Compound	616 11 3	0 14 5
Workshops	108 13 2	0 2 6½
Steaming station	1,353 3 3	1 11 6
Rock drills	2,620 1 2	3 1 1
Surveying	40 10 11	0 0 11¾
Transport	13 10 0	0 0 3¾
Travelling expenses	3 0 0	0 0 1

Stores—

Description.	Quantity.		Value. £ s. d.		Cost per ft. sunk. £ s. d.
Candles	207·2	boxes	135 3 4		0 3 1
Detonators	86	,,	16 15 4		0 0 4¾
Fuse	2,475	coils	42 3 6		0 1 0
Gelatine	418	cases	1,463 0 0		1 14 1½
Iron bars, etc.	696	lb.	7 0 8		0 0 2
Steel bars	2,528	,,	45 1 9		0 1 0¾
Rails	65,445	,,	325 6 0		0 7 6½
Sleepers	259		18 1 7		0 0 5
Bolts and nuts	1,263		18 6 0		0 0 5
Dog spikes	363		7 2 4		0 0 2
Fish plates	3,011		35 19 4		0 0 10¼
Nails, assorted	432	lb.	4 15 10		0 0 1½
Coach screws	82		1 6 8		0 0 0½
Oils, grease	—		7 2 4		0 0 2
Piping	270	ft.	21 7 6		0 0 6
Tools	—		11 6 8		0 0 3¼
Timber, assort.	1,404	cub. ft.	71 16 0		0 1 8
Sundries	—		89 5 9	2,321 0 7	0 2 1
				£11,835 19 5	£13 15 11

Cost per foot sunk, £13 15s. 11·04d.

144 rounds were worked, during which 4,032 holes were bored, equal to a total depth of 28·963 feet 2·4 inches, or an average depth per hole of 7 feet 2·2 inches.

This shaft is an inclined one, and some of the items of cost, such as timbering, are lower than other examples in the Transvaal, where the cost often runs up to from £17 to £20 per foot. In the case of an ordinary deep-level mine in the Transvaal, two shafts sunk to a depth of, say, 2,500 feet would cost at least £75,000; and this is a mere preliminary expense to the opening of the mine, but its benefits are continued for perhaps fifteen subsequent years' operation, impossible except for this first outlay.

Full detailed statements of the cost of mining are usually given now by the best mine managers, and the following three examples, taken from different countries, contain interesting figures of the relative costs of the many items which make up the total:—

(1) The Alaska Treadwell gold mine is on Douglas Island, in the Alaskan territory of the United States. It is on a very wide vein of hard quartz, and of low grade. The conditions are favourable as to wood and water, and water power is available most of the year. The price of labour is high, being 8*s*. 4*d*. per day for labourers, 10*s*. 4*d*. for miners, and 14*s*. for mechanics, all with board and lodgings. The unusual width of the vein, and the very large scale of working (2,100 tons per day), combined with a perfect system of labour-saving devices, allow of very cheap working, so that the total cost of operation is only 5*s*. 4*d*. per ton of 2,000 pounds, made up of the following details:—

	s.	d.
Mining	3	9
Milling	0	8
Smelting concentrates	0	7½
Offices and general expenses . .	0	1½
Construction	0	2
Total	5	4

This example is not one which can be used for comparison in many cases; but it is of great interest as showing how very cheaply work can sometimes be done under favourable conditions. The gold obtained from the ore is only 9*s.* 2*d.* per ton, so that it would be impossible to work at a profit except with these exceedingly low costs.

(2) The following figures from a Transvaal gold mine are instructive as showing relative costs of the various operations:—

	Cost per ton. s.	d.
Mining	7	6·178
Hauling and pumping . . .	0	10·999
Sorting, crushing, and tramming .	0	10·783
Development	0	2·579
Milling	3	1·977
Cyaniding tailings	2	3·925
Mill water-supply	0	3·707
Maintenance	3	8·006
Charges	1	1·962
Treatment of current slimes . .	0	9·810
Treatment of accumulated slimes .	0	5·433
Total working expenses . .	21	5·359

The detailed items of these costs and materials employed are:—

	Cost per ton. s. d.		Cost per ton. s. d.
White wages	6 0·343	Stores	1 10·222
Native wages	2 4·897	Offices and Agents	4·899
Manager	4·829	Office expenses	0·649
Food	9·043	Directors and Committee	1·642
Fuel	3 0·378	Licences	2·608
Explosives	1 5·802	Contractors	11·166
Tools	0·947	Cyanide	1 1·423
Lead foil	1·396	Chemicals	1·108
Steel	0·628	Zinc	0·827
Candles	2·731	Lime	1·265
Insurance, etc.	6·065	Royalty	0·812
Lubricants	2·861	Native labour expenses	9·305
Mercury	0·587	Broker	·797
Shoes and dies	1·772		
Screening	0·357		

Total cost per ton (2,000 pounds), £1 1*s.* 5·359*d.*

(3) A West Australian mine, with a similar treatment of ore to that of the Transvaal mine, shows the following costs:—

	s.	d.
Mining	8	2
Mine development	6	3
Treatment	8	6
Charges on bullion and concentrates	1	5
General	2	0
London expenses	1	2
Colonial taxes	2	0
Total costs per ton (2,000 pounds)	29	6

The costs of working copper, lead, tin, and zinc mines will vary with methods of treatment employed and with the scale of working, as in the above examples of gold mining.

CHAPTER VII

MINING LAW

THE mining law of most countries is framed with a view to encouraging the discovery of mineral wealth, and to allowing the prospector even of very limited means to enjoy the benefits of his discoveries, and to obtain on reasonable terms a satisfactory title to the same. In most countries some condition is attached to the holding of title intended to secure some degree of proper development of the ground granted. In the Australian colonies there are labour conditions attached to the holding of mining ground, which necessitate the regular continuance of work on the property; and this arrangement is far from an ideal one, because whenever the question of labour enters into a legal matter the question of politics is likely to creep in, and the door is open then to uncertainty and injustice. As a matter of fact, mining titles in Australasia are usually quite safe, and in practice not unsatisfactory; but there are occasional exceptions, which are sufficient to prove that conditions affecting title should properly be limited to what is within the control of owners: and conditions as to the employment of labour are not always within the powers of owners. In Mexico there are simple and satisfactory mining laws, fully defining and protecting the rights of owners, whether native or foreign; and in South America generally no difficulty is found as to the limits and character of title to mining lands. The mining law of the United States is the worst in the world, because it is based on a myth, and is honeycombed with contradictory decisions. In the earlier attempts to codify the mining regulations—which were originally of local origin, during the gradual opening of the western mining camps—it was the endeavour to give to the individual prospector the fullest possible benefit of any discovery of value which he might make; and it was accordingly enacted, that while the surface land he might take up as a single claim was limited in length and breadth (at present 1,500 feet by 300 feet), he was allowed to follow his vein down into the earth within his end boundaries to any depth, and wherever the incline or dip of the vein might carry him beyond his side lines. The claim has to be laid out with reference to the line of outcrop of the vein, or its "apex" or top nearest the actual surface; and the extent of the workable length of the claim may be materially changed by the establishment of any variation in the course of the vein, as compared with guesses made on this at the time of the discovery and location. While the intention of this law was excellent in its way, the law itself was based on a supposed regularity and simplicity of vein phenomena which do not exist. The fundamental idea of a clean-cut vein, easily traceable along the surface of the ground, and with a regular inclination into the earth, rests on ignorance of the experience of mining; and the obscurity introduced by such a theory is not cleared up by the additional grant to the discoverer of the right to all "dips, spurs, and angles" which may be developed in the following of his vein outside the vertical planes of his surface boundaries. Any discovery of real value, and the consequent taking up of one or more claims, are at once followed by a rush of other prospectors, and the ground all around is located and pegged out; so that there is always an army of claimants ready to take advantage of any technical weakness of a title once proved valuable. Now veins do not always have a regular course, but are subject to great changes in direction. They do not always have a regular dip or inclination; they are subject to splitting in length and in depth, and to crossings with other veins; and two separate veins distinct at surface may unite in depth to form a single one, and sometimes, deeper still, may separate again. Then, again, there are many rich ore deposits which are not veins at all, and subject in themselves to still other variations of occurrence. From all this it follows that there is a most glorious uncertainty as to the extent of rights of a mine owner in the United States, and even as to the existence of any title at all in some cases; all of which opens a grand field for lawyers. It has happened—in absolute necessity for some guidance—that certain broad decisions are recognised as the result of years of litigation in certain States, and generally acted on by the courts there; but the difficulty must always remain while it is possible, as at present, for a number of experts to swear to one interpretation of geological conditions, while an equal number can conscientiously make affidavit to an opposing theory. One English mining company has been subjected to law proceedings for over fifteen years, and has in the meantime worked out the mine; but the legal mine does not seem exhausted by any means. A good mine, unless very favourably circumstanced by controlling all the ground immediately around it, has generally to go through tribulation to a peaceful title; and the usual method of securing such peace is by buying up likely claimants while claims are still reasonable.

In most mining countries, the area granted to a mine owner being regulated by boundary lines, there is no chance for serious difficulty as to underground rights, because these are bounded by vertical planes through the surface boundaries, and their limits can always be accurately determined by independent survey without room for dispute. An exception to this simple and desirable principle is furnished by Rhodesia, where the British South Africa Company has established a code of mining laws which contains the bad features of the United States law as to what are called "extralateral rights," and as to the dependence of title to a vein on the position and discovery of its apex or outcrop within the property. In the case of Rhodesia, however, experience gained in the United States has been applied to limit the evils invited by the adoption of an objectionable system; and also, through the peculiar position of the Chartered Company, provision has been made for a more simple and direct legal settlement of disputes; first by mining commissioners, and for appeal a High Court with rules of procedure laid down for it in the mining ordinance.

CHAPTER VIII

THE OCCURRENCE OF ORE

THE success of mining must always chiefly depend on the way the ore occurs in the ground. If Nature has been liberal in the laying down of the store, man will be richly rewarded in depleting it; and sufficient has already been said about the importance of mining in general, and of the many prizes in its conduct, to show that Nature has been generous enough to encourage all reasonable hopes. But this generosity is of strangely irregular distribution; and would appear to follow no one general law which man might be capable of guessing, and so too rapidly exhausting the mineral wealth packed in the earth. Geologists have been occupied for many years past on the growing mass of details relating to the occurrence of all kinds of ore, and many instructive theories and valuable side-lights have been established; but nothing comprehensive or absolutely guiding has been evolved. In fact, the variety of occurrences implies a variety in the determining conditions of ore deposition; and the rules of one district may be the exceptions in another; so that theories as to a given deposit may be reached only when the mine is exhausted, and then not be applicable to the next mine. The various theories relate chiefly to the methods in which the metallic contents have been collected into the ore deposits; and where they seem tenable are often only of academic interest, because they do not touch on the commercial question of what portions of the ore-bearing rock contain such a concentration of value as to be payable under ordinary working conditions. While this failure of science, so far, to do much in serving as a guide to the selection or development of mines must be acknowledged, it by no means follows that it is useless or should be ignored; for most valuable service is often rendered by the systematic collection of facts, and by the forming of a working theory in place of undirected groping. In fact, the absence of exactitude must be taken as evidence of a great variety in Nature's methods of depositing ores, requiring long-continued tabulation of experience. In the meantime, this great uncertainty attending the opening of nearly all mines remains unquestioned as the great necessary risk in most cases, and some attempt will be made here to illustrate it; while in other chapters it will be shown how essential it is to recognise its presence in the valuation of mines.

There are occasional deposits of ore—chiefly of the baser metals, as copper, lead, and zinc—which, from their occurrence in bold outcrops or in exposed faces of hills, are at once of such magnitude and so easily attacked by shallow pits and trenches as to leave no question, even on first discovery, of their being valuable and profitable to work; although the extent of their value is only determined later by work in depth. Such ore bodies, however, are exceptional, and it is more usual that even the large masses coming actually to the surface are by surface change so altered in appearance as not to be immediately recognised for the character of ore found at a little depth. When work has progressed so far on these large concentrated bodies as to prove certainly a great quantity of ore, it is still necessary not to push too far the assumption of continuance: for the bottom or ends of the deposit may be nearer than guessed at, and there is no less chance of errors when calculating in millions than in thousands of tons.

The form of ore occurrence most common is that known variously as a vein, lode, ledge, or reef. There are some minor differences represented sometimes by the selection of one or other of these terms, but they are often used interchangeably and according to local custom only; and in any case, for the general purposes of a brief description, they can be taken as describing the same thing. A vein is a cleft or fissure in the earth filled in with a substance different from the surrounding rock, and consisting very often entirely or in large measure of what is known as quartz. A vein may be persistent and easily traceable for many miles, or it may be of very limited length. It is, in normal cases, in an inclined position, usually not flatter than thirty degrees from the horizontal, nor steeper than eighty degrees. The vein filling, or "gangue," as it is often called, is of no value; and therefore strong and persistent veins may be found which are entirely without value, as far as anyone is ever likely to open them on chance. The distribution of paying ore through the vein is the point which determines its commercial value; and it is here that the great variety and extreme irregularity occur, and to which reference has been made. There are some veins in which the pay ore occurs in fairly regular "shoots," or chimneys, up to a thousand or more feet in length, and going down in the vein to depths as great as are workable. Other veins contain rich ore at the surface, which gets gradually poorer with depth, until it becomes unpayable. Others, again, are not profitable in their earlier working, but become payable with deeper development. Veins frequently contain their payable ore in occurrences which seem to follow no law, and can only be described as irregular bunches or pockets; but there are other somewhat similar cases where long-continued development shows a regular succession of detached ore bodies, following some recurring changes in the surrounding rock or in the vein itself: and these changes then become valuable indications or guides to follow.

Changes of a radical character occur sometimes with depth. A vein containing payable gold or silver near the surface will sometimes develop below into a copper mine, and lead ore may be replaced in the same way by zinc.

As an illustration will make the variety in ore occurrence more evident than mere description, reference is here made to two drawings on Plate II., these being actual sections of two gold mines—No. 1 in the United States, No. 2 in South Africa. In each of these sections the portions shaded dark are the parts of the vein which have been worth taking out, and so can be accepted as showing where the pay ore occurred. The No. 1 mine was a good paying mine for a number of years, and yielded something near £3,000,000 in gold and silver out of a little over 1,000,000 tons of ore raised; and it paid dividends of about £650,000. The ore became gradually poorer in sinking, until operations ceased to pay at a depth of about 900 feet; no other property near it was payable at all. The No. 2 mine is still working without diminution of value in depth, and shows a marvellous regularity in ore value along the entire length of the property (some 3,000 feet), with adjoining properties on each end having equally continuous runs of payable ore.

This second mine, to the extent of the workings shown in the drawing, also produced about 1,000,000 tons of ore to a depth of 500 feet, although the combined width of the reefs worked was on the average not more than half that of the vein in No. 1 mine. It produced £2,254,000 in gold, with a profit of £737,000 from the work shown. Since the date of the work shown on the drawing, developments have continued to a depth of 1,000 feet. Furthermore, another mine on the dip of the reef is working most profitably on the same continuous ore body to a depth of 1,500 feet on the reef, and diamond drill holes prove the continuance over 2,000 feet below that.

It is evident at a glance that the distribution of the pay ore in mine No. 1 is very erratic, and could never have been foreseen; and it follows that prophecies as to the future of the mine when in its early stages could only have been wild guesses. The levels and drifts in this mine aggregate about seven miles in length, and work has been carried on in it for some twenty-three years; which facts may be taken as some guide in discounting the glib estimates of so-called "experts" as to ore in sight in mines but little developed. On the other hand, the inexperienced but hopeful prospector who first dug a pit on No. 2 mine, and then calculated on the full length of his property being pay-ore to a depth of 1,000 feet, would have made a very accurate diagnosis of the case—and should never attempt another.

Outside of the more ordinary occurrence of ore in veins, mining is also carried on in beds, or strata, of certain rocks which may contain minerals worth extracting; and payable ore is also found in the form of irregular masses in a rock such as limestone without any definite line of occurrence, and therefore with little or nothing as a guide to direct in the search for another bunch when one is worked out. As illustrations of the importance of some of the bed formations, mention may be made of the native copper mines of Lake Superior, which have been in successful operation on a large scale for more than forty years. The wonderful gold deposits of the Witwatersrand in South Africa consist of beds of what is known as "conglomerate," which is a gravel full of rounded pebbles hardened into a solid rock; but owing to changes in the character of the beds, and to the form of occurrence of the gold in them, they are, from a mining point of view, more of the nature of a vein than of a simple bed. They possess, however, the regularity, great extent, and relative uniformity of beds as compared with veins, and this applies to their gold contents as well as to their actual form.

In some mining districts, where there may be a large number of veins, or a great established length on one or two veins, and where a number of mines may be opened in consequence of the success of one, it happens that all are failures so far as paying is concerned; and the one great mine of the region stands alone. In other districts the ore is much more impartially distributed, and there may be several great mines, and a number of lesser, but still paying mines, and the usual accompaniment of total failures. These varying results naturally follow from what has been said above as to the irregularity of ore occurrences; and in another chapter some details are given of the proportion of successes to failures in the cases of certain districts well known to the British investor in mines.

It is impossible here to do more than roughly indicate, as above, the more important forms of ore occurrence. As regards describing the different kinds of ores met with in mining for the various metals, it is best to limit this to a list of the common minerals to which reference is frequent in mining reports; and to include this description in the Appendix, useful for reference when required, and very convenient for passing over if not needed.

CHAPTER IX

MINING DISTRICTS

THE different mining districts of the world have different characteristics and different histories; as a consequence of that great variation in the method of ore occurrence, which is the subject of a special chapter. It is useless to attempt any description of all the well-known mining centres; but as illustrative of the differences which occur, and as bearing on the general question of mining risks, a few words on the two countries which at present are chiefly interesting the mining public will be justified.

The Transvaal has been remarkable for the great regularity and extent of its bedded reefs, and before the war had reached a yearly gold production of about £16,000,000. A concise but very complete description of the gold-field, its history, and the conditions affecting its mining work will be found in Appendix A. One marked peculiarity of the gold occurrence is its concentration in a series of reefs in one comparatively limited area of the country. No other mining district yet discovered can offer the assurance of the vast future production which can be counted on in the Transvaal.

The Government mining engineer, in his report for 1903, makes the following statement of the past and remarkable prediction of the future as to 36 mines only out of over 120 mining companies:—

Tons already crushed	29,071,058
Tons remaining to be crushed	109,285,987
Crushing capacity per annum	6,995,690
Average length of life	15 years
Future profits	£102,597,926
Present value of future profits on basis of 7 per cent. dividend and 3 per cent. amortisation	£51,630,646

In the early days, before the nature of the reefs had become known, they were, as usual, the subject of much ignorant comment and calculation; but in no other country has Nature been so kind to the early and reckless prophets, by justifying their predictions in a generous and wholesale manner, as she has done in South Africa.

Western Australia has within the last few years proved a most valuable contributor to the gold production of the world, and is now yielding annually over £8,000,000 in gold. This yield is from many mines, distributed through a number of mining districts, of varying character and widely separated. As is frequently the case, the greater part of the total yield is from a few rich mines. From the public investor's point of view, the history of Western Australia has been very unsatisfactory, as a few facts and figures will show; and much of the disappointment and disgust which have resulted comes from risks which are not among the necessary risks of mining, as will be further explained in a chapter on this subject.

During the eight years from 1896 to 1903 inclusive, English mining companies for operation in Western Australia to the number of 673 were registered, and with an aggregate capitalisation of £99,601,828. During the same period 475 of these companies, with a capitalisation of £35,216,608, were liquidated. These figures refer only to English companies, and therefore do not include the great number of Australian promotions nor the many properties which have been worked privately without incorporation. To exhibit the results from this extensive capitalisation and investment, the following figures are taken from a paper lately read before the Institution of Mining and Metallurgy:—

About 2,500 mining claims are still being worked out of over 7,000 taken up in the past, and of these 1,333 produced more or less gold in 1902. Of the producing properties, a division into four groups showed (1) 1,220 claims of no proved paying value yielded 11 per cent. of the year's gold; (2) 85 mines of small or doubtful value yielded 11 per cent.; (3) 13 mines of fair value and prospective greater value yielded 12 per cent.; and (4) 16 great mines of assured value, and good future life, produced 63 per cent. of the gold. Of this last important group, 11 mines are in the ore district of Kalgoorlie, and are contained within an area of some four square miles, and they yielded 54 per cent. of the gold of the whole proclaimed mining districts of the state, covering a total area of over 300,000 square miles.

The gold veins of Western Australia, outside of the Kalgoorlie district, do not require any special description, being similar in general character to veins in many other parts of the world; but in Kalgoorlie is seen one of the great occasional novelties in ore occurrence which help in extending the field of profitable gold mining. As in similar great discoveries, the men of least experience or least honesty were the readiest to prophesy, and to help in the capitalisation of their prophecies by reports loaded with misrepresentations. Considering that no such ore deposits were known elsewhere, that in many cases the surface values were slight or extremely irregular, and that several years' work was necessary to prove anything like permanent richness, while, after all, only eleven mines out of several hundreds in the immediate neighbourhood have proved valuable, some conception can be formed of the amount of ignorance or fraud which presided over the original capitalisation of most of the companies. It was notorious among mining men that in the early days of Kalgoorlie many of the authorities accepted on prospectuses in London were of a reputation which would have effectually stopped promotion in the United States or in Australia, where the "experts" were known. Several of the now proved great mines were among those which were floated on reports which no good mining engineer would pass; because on their face they were based on either incompetence or recklessness.

At the present time it has been proved that in some of these Kalgoorlie mines the rich ore extends to a depth of at least 1,750 feet, while the shoots of pay ore are both long and wide; and the whole of the ore averages higher for the eleven good mines than in any other gold-mining camp in the world, taking into account the tonnage treated and opened. It is therefore safe to state that for some years to come Western Australia will be a very large gold producer, even if no more great mines be opened than those already well developed.

Not only were the early prospecting days of Western Australia marked by more than even the usual recklessness in English company promotion, but several of the big mines and large numbers of the worthless ones have been disgracefully mismanaged; and the shares of the companies have been shamelessly manipulated on the London market. Shares which represented at fancy prices properties of no proved value at first, were rapidly inflated as discoveries were made; so that in all cases prices were reached a few years ago, during the boom times, which are not even justified at present, with all the great value added by later development and by the now proved permanence of the deposits of ore. In this, as in the matter of the early mining reports, it was evident that the British public would accept the guidance and authority of men whose past records would not bear investigation, but whose luck in stumbling on a single good mine, while engaged in wholesale promotion of worthless ones, prevented their too early exposure. What this guidance was worth is shown by the fact that the boom in Western Australia started chiefly on the strength of statements about the one district of Coolgardie, on the mines of which English companies were promoted with a total capital of £11,040,000; and not one really good mine has been developed there.

CHAPTER X

ORE IN SIGHT

EVERYONE who has read a few prospectuses of mining companies, or has had occasion to look over reports on mines, will be acquainted with the expression "ore in sight." There are some nearly equivalent terms used also to describe approximately the same thing; as, for instance, "ore reserves," "ore blocked out," and "ore developed." Putting aside the finer shades of meaning which engineers usually attach to these respective terms, they can all be taken as describing ore which has already been discovered, and can be calculated on with some certainty, as distinct from ore which may be found, but which cannot be counted on with safety until it is actually proved to exist by the development of the mine. It is clear that in buying a mine, or in considering the value of shares in a company owning the mine, great importance must be attached to the value of the "ore in sight"; while the value to be allowed to the chances of discovery of ore beyond this must be of a speculative nature, the risk of disappointment and the chances of success in which depend on a variety of conditions. Mines so rapidly increase in value with the discovery of new bodies of ore, or with the proved continuance of old ones, that owners will not sell a promising property at a price represented by the net value of the ore in sight; but they expect to be paid, and also to be paid well, for the future chances. There would be small risk in mining investment if the purchaser could obtain possession by the payment for ore in sight, as estimated by a thoroughly safe mining engineer. It follows that the general rule must be expected to apply, and that in buying either a mine, or shares representing it, a fair price must be allowed for the future prospects, in addition to full price for present proved value. This being the case, it is of the utmost importance that what is estimated as being ore in sight should properly come within the meaning of that term, as understood by reliable mining men.

In the past the term under consideration has been most grossly abused, so far as the general public are concerned; for prospectuses and reports have been issued by the hundred, on which, in the aggregate, enormous capital has been raised, and yet containing the most palpable misrepresentations of the quantity and value of ore in sight, on which the capitalisation was largely based. It is necessary first to give some particulars of the exact meaning of "ore in sight" in a mining sense, and of the methods of estimating it, and it will then be easy to explain how subject it is to abuse, both fraudulently and in good faith.

In order to calculate ore in sight, it is necessary that the ore in question should be actually developed into blocks of reasonable size, which are exposed on three sides at least for examination and sampling. For example, if two levels driven on a vein are 100 feet apart, and are connected by two shafts (or winzes) also 100 feet apart, there is a block of ground exposed on its four sides by these four openings, which is available for examination and sampling. Such a block is said to be "in sight"; and, if it be properly sampled over the four faces, a basis can be established for calculating its value. Assuming that the average thickness of the vein is five feet, the weight of the block of ore is found by multiplying its depth by its length—in the case taken, 100 by 100 feet—and the result multiplied by five, the thickness, gives the total cubic feet of 50,000. This cubic measurement, divided by the number of cubic feet of the particular ore required to weigh a ton, gives the number of tons of ore, which, in turn, multiplied by the average value per ton, based on sampling the four sides, gives the gross value of the block of ore in sight. The above is a simple case in illustration of the principle of estimating ore in sight; but in practice it is neither so simple nor so safe as it may appear. From what has already been stated about the irregularities in ore occurrence, it will readily be understood that, whereas the exposed faces of the block of ground may be, on the average, of good workable value, the unseen inner portion may be worthless in part, or may be richer than the outside. In some deposits the regularity of occurrence may be so marked as to make the calculation of reasonable-sized blocks from their exposed faces perfectly safe; while in other mines the calculation must be materially modified on the judgment of the mining engineer, to avoid grave errors in the conclusion. If such caution is necessary with a block of ore opened all round for sampling, it is evident that calculations of tonnage and value are still more hazardous on ore not fully exposed; and it is this latter class of calculation—or, properly speaking, this kind of guessing—which has been a fruitful source of disaster in company promotion.

The question of ore in sight was the subject of a paper read before the Institution of Mining and Metallurgy in London in 1902, and which will be found in Appendix C. Reference is made to this paper for a fuller description of the generally accepted rules as to estimation of ore in sight. The matter was considered of such importance in connection with the over-capitalisation of public mining companies, and the consequent unnecessary increase in the risk of mining investments, that the Council of the Institution of Mining and Metallurgy issued to all its members, and to the Press, the following memorandum:—

"ORE IN SIGHT."

The Council of the Institution of Mining and Metallurgy, recognising the great importance to the Mining Industry, and to the public generally, of the subject dealt with in the paper on "Ore in Sight," by Mr. J. D. Kendall (*Transactions*, vol. x.), appointed a Committee to consider what steps the Institution might usefully take in defining the term "Ore in Sight."

The views expressed by leading members of the profession showed a great divergence of opinion as to the definition of the term.

After due consideration and discussion, the Council came to the following decision:—

1. That Members of the Institution should not make use of the term "**Ore in Sight**" in their reports without indicating, in the most explicit manner, the data upon which the estimate is based; and that it is most desirable that estimates should be illustrated by drawings.

2. That as the term "**Ore in Sight**" is frequently used to indicate two separate factors in an estimate, namely—

   (*a*) **Ore Blocked Out**—that is, ore exposed on at least three sides within reasonable distance of each other—and

   (*b*) **Ore which may be reasonably assumed to exist**, though not actually "blocked out"—

these two factors should in all cases be kept distinct, as (*a*) is governed by fixed rules, whilst (*b*) is dependent upon individual judgment and local experience.

3. That in making use of the term "Ore in Sight" an engineer should demonstrate that the ore so denominated is capable of being profitably extracted under the working conditions obtaining in the district.

4. That the Members of the Institution be urged to protect the best interests of the profession by using their influence in every way possible to prevent and discourage the use of the term "Ore in Sight" except as defined above; and the Council also strongly advise that no ambiguity or mystery in this connection should be tolerated, as they (the Council) consider that such ambiguity is an indication of dishonesty or incompetency.

There is, of course, nothing new in the above recommendation; but its force lies in the fact that a public statement of the kind leaves no excuse hereafter for a violation of what has been long recognised among careful mining engineers and mine managers as the proper use of a term, too often entirely misapplied by the careless and the dishonest.

An illustration of the absolute abuse of the term we are considering is furnished by the history of an Australian property which made a great stir in 1898, and the shares of which were dealt in largely at prices which were equal to a valuation of over a million sterling for the mine. Now the mine was a combination of a lot of old deserted pits and open workings, which had been worked for years with poor average success by Australians, and afterwards were burrowed in by Chinese till even they ceased to make a living; but this irregular unprofitable property was thought good enough as a basis for an English company with a capital of £300,000 as a start, and subsequently worked up in the Stock Exchange to £1,400,000. A statement was freely circulated that "the clearing of the shafts on the mines (previously worked with extraordinary results by Chinese miners down to water-level) has exposed immense bodies of high-grade ore, and it is computed that upwards of £2,000,000 of gold is now in sight." A few months after the statement above quoted was made, and before any real development work had been done of a serious nature, the enthusiastic chairman at a crowded public meeting actually stated that one portion of the property had "upwards of £3,000,000 value of ore in sight and ready to be crushed," and another portion had "over £2,000,000 of ore in sight." The property never did pay the English company, and after a variety of interesting Stock Exchange movements, in the way of subsidiary companies and reamalgamations, it has been almost forgotten.

An extended and highly instructive list of similar striking cases could be taken from the prospectuses and chairmen's speeches of English mining companies, to show how the term "ore in sight" has been used to the loss of the money of the public. In some instances, no doubt, optimistic chairmen of companies have used it without knowing its full significance; and in other instances mine managers, whose experience has been of a very practical working-miner character, have blossomed suddenly into mining engineers, and have handled a technical term as confidently as they would handle a pick, but without the same knowledge of its effects.

CHAPTER XI

THE VALUATION OF MINES

IN the chapter on "Ore in Sight" mention has been made of the important bearing on the valuation of mines which the ascertained tonnage and value of ore must always have. It must not be supposed, however, that the valuation of a mine is so simple a matter as would be implied by the mere measurement and sampling of opened ground, even with the addition of a certain arbitrary percentage as allowance for future prospects. In the reaction which naturally takes place in dull times, following a burst of speculation based on both rash and fraudulent promotions, it is sometimes attempted to lay down rules for the public guidance by statements to the effect that capitalisation must bear a certain fixed relation to the net value of ore in sight; and, as a consequence, only a certain percentage of the capital should be represented by prospects of future developments. The proportion which the net value of the ore in sight should bear to the whole capital or valuation of a mine is usually taken at from 50 to 75 per cent. A little examination of the varying conditions affecting the value of mines will show that the attempt to lay down rules of this kind is quite useless to the public, and very misleading and unsafe if applied in practice even by those whose knowledge of mining matters would permit them to make the application.

What has been said on the subject of the occurrence of ores, will be sufficient to enable the most inexperienced to understand that in the case of two different mines having, for the sake of argument, exactly the same net value of ore in sight, the chances for future discoveries may be vastly different. The two illustrations on Plate II. will make this evident. In the case of mine No. 1 it is obvious that the extension of the various shafts, levels, or winzes would carry very small chances of valuable discovery; while the extension in depth of the workings in mine No. 2 can be counted on with almost absolute certainty to show a continuation of the payable ore value; in fact, the ore body is now being worked 1,000 feet deeper in the original of the drawing. These are, it is true, somewhat extreme cases for actual comparison; but the broad truth illustrated remains the same, if the case of two mines more nearly alike in their mode of ore occurrence be taken. In the same district, and even on the same vein, two mines may have, and generally do have, very different histories as regards the sizes, distribution, and values of their pay ore bodies; and as a natural sequence their respective prospects at any moment of their existence must be very different. Now it is the speculative chance, or the prospective value, which is the really important and attractive element of mining investment. There would be little temptation to put money into mining if, with its acknowledged risks, there were not the strong inducement of future prospects; and therefore the exact proportion of ore in sight to be demanded must be a varying one, not an arbitrary standard.

In speaking thus broadly of mining, it seems necessary to call attention to what is seemingly an exception, and this is the Witwatersrand gold district of the Transvaal. As more fully explained in the chapter on Mining Districts, the great extent and comparative regularity of the gold reefs have led to systems of valuation of mines there which are similar to what would be adopted with iron or coal mines, and are based on calculations of return of capital, and reasonable interest while invested, which would be entirely out of place in nearly all other cases of metalliferous mining. Even in the exceptional case of the Transvaal mines, the original capital is never based on the calculations of ultimate value of the property; but as the developments justify the original belief in the regularity of the ore occurrence by proving its existence, so the share price advances towards the equivalent figure of the original calculation, and often exceeds it. It is well known that certain sections of the Witwatersrand reefs are much richer than others; and it is the collected experience of many years' work, in dozens of different mines, which has to be used as a basis in the valuation of any particular property, according to its situation or its special developments. So that here, too, no hard-and-fast rule can be promulgated for public guidance: but with a knowledge of all the facts far greater certainty attaches to proper estimates of prospective value than elsewhere in gold mining.

Not only is the practical valuation of a mine dependent usually more on prospective value than on the estimated value of the ore in sight, but it must be understood that the calculation of this last is by no means a scientific certainty, and that the correctness of the estimate depends on conditions of ore occurrence which vary in different mines. One of these conditions, viz. the irregular distribution of rich ore in a block of ground which has been sampled on its four sides, has already been referred to in the chapter on "Ore in Sight." Then, too, great variations in the thickness of the vein may occur within the block, so varying its actual weight or tonnage; and, furthermore, intrusions of absolute waste rock will often reduce the quantity of actual ore below that reasonably to be expected from mere outside measurement and sampling. All these conditions have to be considered by the engineer who makes the estimate at any time, either of the value of ore in sight in a mine or of the value of its future prospects; and as none of these conditions can be defined by any rules in advance, the accuracy of any calculation must in the end depend largely on the personal equation—the character and experience of the man making the estimate. This matter of the individual ability of the engineer is treated more fully in the chapters on Mining Engineers and the Risks of Mining; and it is sufficient to state here that it is a governing condition of the other varying conditions which go to make it impossible to establish any workable rule for the guidance of investors, based merely on a proportion between the value of ore in sight reported, and the capitalisation of a mine. Broadly, of course, no one can object to the statement that the nearer the value of ore in sight approaches the total capitalisation or valuation of a mine, the less margin of risk there is left for the unknown or prospective value. In practice, mine owners or shareholders will not sell for the reliably ascertained value of ore in sight, if the prospects for future discoveries are good; and unless such prospects are good, there is no object for the buyer to purchase, simply in order to demonstrate that the engineer is right in saying he can probably get his money back. When the prospects for the future are good, there has to be, as in all bargains, either some compromise between the buyer and seller based on their respective positions and desires, or a difference of opinion as to the prospective value. In some cases the history of a district may guide the investor or his engineer in deciding to pay a good price for future chances; or, in a new district, the indications may be of so promising a general character as to justify the risk; or, again, the total investment may be of so comparatively a small amount as to induce a form of speculation in which the element of luck is openly admitted as of importance.

The great prizes in mining are realised by those who take the earlier risks, when the mines are not greatly developed, and consequently when they do not have much ore in sight; or these prizes are secured at times when well-developed mines are in a period of unproductive development, with diminished reserves, but possibly with some indications of approaching discoveries perceptible to the well-informed. In many cases these prizes can only be accounted for by the mere matter of blind luck; and no consideration of the subject of valuation of mines would be complete unless a place be reserved for the item of luck. It will not be expected that any useful information can here be furnished as to the control of luck; but some attempt is made in the chapter on Mining Risks to show that the chances of becoming a victim of what is sometimes wrongly considered as bad luck, may be reduced by avoiding risks which are palpable invitations to failure. There have been many instances of reckless valuation of mines, which have been justified apparently by the later ore production of the property, although in reality the success of the mine was entirely due to later discoveries, which no one could have foretold at the time of the original valuation. Western Australia has furnished some remarkable cases of this brilliant divination on the part of mining men, and men in the mining business.

CHAPTER XII

MINING ENGINEERS

FROM what has preceded in reference to some of the complicated problems which enter into the question of the valuation of mines, it must be evident to all that the duties of a mining engineer are often responsible and difficult; and it is often said that he must know a little of everything, to reach his highest development. Mining is not an exact science by any means, and no amount of mere theoretical and scientific training can equip a young engineer for the proper fulfilment of his professional duties. It is worth while to examine a little into the qualifications most necessary for a really reliable mining engineer.

In the first place, it must be assumed, as an essential, that he is morally trustworthy, because opportunity for personal advantage at the expense of others is very frequently present in the course of his career; and at times the opportunity may assume an insidious and harmless form, which requires for its resistance an ingrained sense of honour, and not a mere intention of being honest. A scientific training, either before or during the acquirement of practical experience, is necessary to a full understanding and application of the determining elements of success; and it is yearly becoming more evident, that the strictly professional work must be in the hands of the professionally educated. To acquire the necessary practical experience, years must be spent, and a great variety of conditions must be studied: experience in a limited field, though long continued, may be very narrow and not very instructive. For instance, although the Transvaal is in many respects the best example of modern work by mining engineers coming from all countries, a man whose experience was confined to it might, on immediate change, be an exceedingly unsafe guide, technically and financially, in another part of the world. Mining, being a business undertaken for profit, and not for scientific research, must be considered and directed with a commercial mind; so that all local conditions have to be weighed in any decision as to the payability of a mine, or the best method of working it. This implies a business head as a necessary condition of good judgment. Questions of law, as affecting title and restrictions on freedom of working, though usually subjected in addition to proper legal advice, can often be looked into only by the engineer on the ground. This does not necessitate a course of law studies; but it does frequently need practical acquaintance with the general application of mining laws, which a business experience with them gives. In planning the work to be done in a mine and on the surface, the engineer will be successful in proportion as he has the knowledge of both a civil and a mechanical engineer, as well as the necessary training of a mining engineer. He is usually expected to settle all questions of ore treatment; and, although the tendency of the age is rather towards the specialisation of this branch in the hands of the metallurgist, the mining engineer is still very generally (outside of smelting operations) also the metallurgist, so far as relates to the deciding on a process, and planning the works for the ore treatment. On the top of these various qualifications there is the necessity for the personal elements, common to all successful business, of energy, application, and, chief of all, common sense. Some of the duties of the mining engineer can only be carried out fairly by patient and continuous labour; and the man who shirks this, and trusts too much to assistants, or to his powers of observation and generalisation, is not reliable in the highest sense.

Some of the difficulties connected with reports on mines, which have to be faced by the mining engineer, are referred to in a paper read before the Institution of Mining and Metallurgy on "Mining Reports and Mine Salting," which will be found in Appendix B.

Where so much is required in a profession, it is only natural that many members will fall short of a high standing; and the history of mining is full of instances of imperfect, bad, and dishonest work. It is necessary, however, to point out a very important distinction between the classes of men responsible for these shortcomings.

The title of "mining engineer" is often misused, and to the general public comprehends what are really three different classes of men. There is the mining engineer proper; the mining engineer improper, or "expert"; and the so-called "practical" mining man. The qualifications of the first class have been given above, and will be generally admitted as most desirable in a man who is to be entrusted with the investment and direction of capital in such a business as mining. The application of the alternative title, "expert," to the second class is perhaps a little premature, for it is still very often used in good faith for members of the first class; but it is not liked by mining engineers, and from association with many unpleasant transactions, it smacks of charlatanism. The third class is a wide one, containing men who have worked their way up from the position of mere miners into that of managers—and often the very best of managers—with all gradations downwards, into men whose practical mining experience is no excuse for their taking upon themselves anything beyond manual labour, but whose ambition and audacity impel them to solicit or accept much higher responsibilities. A few words as to the two classes, so frequently considered as identical with mining engineers, will make clearer the concluding remarks on this latter class.

The charlatan is found in all professions and forms of business; but the growth of the mining industry, and the conditions of mystery so often attendant on its promotion and conduct, make it essentially favourable for the field of the self-constituted expert. In most kinds of business in which the public may be asked to invest by company promotion, the ordinary man will be able to use some part of any good judgment he may have, and be able in a measure to appreciate whether the technical authorities who may be quoted are likely to know anything of what they are reporting on or not; and if he desire to make some personal investigations, he can without much difficulty find guidance in these which will be some little assurance of safety, or of the character of the risks taken in the investment. In mining, however—either because the temptation of greater occasional successes than elsewhere overcomes the general belief in its risky nature, or because it is felt hopeless to treat the matter of investment except as a lottery in which business precautions are useless—the general tendency has been to act in a manner which all would recognise as reckless in any other business.

During times of market activity in mining, many prospectuses are issued which are based on statements of "experts," who are either without the necessary experience, or are absolutely dishonest; and these invitations for public subscription are of a character which can, at sight, be determined as either ignorant or fraudulent by any reliable mining engineer. One of the reasons of the success of such issues will be found more fully explained in the chapter on the Risks of Mining, in connection with the financial Press; and some attempt is there made to show that much of the mischief of the charlatan is avoidable, even by the general public. It will be conceded by all, that this class of advisers is one to be avoided; and the misdeeds, or mistakes, of its members are not to be charged to mining engineering.

The class of "practical" mining men is not at present so easily dismissed, because there are all gradations from the mere miner, or skilled labourer, up to the most competent manager, who has educated himself to the full requirements of a mining engineer. Some thirty years ago the number of mining schools was small, and the graduates bore a small proportion to the demand for mine managers; and furthermore, there was still a strong prejudice in favour of the practical miner, even for work he was not at all fitted to perform. The consequence was, that a mining captain was often taken from a tin mine or copper mine in England, and sent to report on a gold mine in some foreign land. Of late years the multiplication of mining schools, the increasing belief in the value of scientific training, and the diversity of conditions of mining and ore treatment, have led to the growing custom of giving preference to properly educated men for the responsible work of reporting on mines, and for controlling mining operations. It must not be imagined, however, that mere college education will fit a young man for replacing the old-style mining man in responsible positions; because years of practical experience are necessary to supplement any scientific training; but the proper training has now become the almost necessary groundwork for the best practical results; and the great number of graduates now yearly turned out, will give a supply of the proper material to insure the control of most responsible positions hereafter by mining engineers and metallurgists.

The practical miner has been a necessity of the past, and is to be credited with much of the present development in mining and milling methods; but he has also been a source of many failures through incapacity or dishonesty; and, furthermore, in some districts he has been an absolute bar to such reasonable advance and improvements as every industry requires with its growth, so that such districts are prominent even to-day by their shortcomings as compared with modern systems elsewhere.

The mining engineer has, by his early training and the advisory nature of his duties, the great advantage of a foundation of professional character. He has from his joint training with others an *esprit de corps*, and full acquaintance with an established code of morals—a code not merely of honesty, but of professional rectitude of conduct. These advantages are so great in practice, as to make a given number of men who enjoy them, more reliable and conscientious on the average than an equal number of other men, who have for guidance only such general principles of honesty as, in varying degree, may have been impressed on them by their practical experience and business surroundings. In the chapter on Risks of Mining, this matter of the comparative reliability of mining engineers and mining men is again referred to, in explanation of some of the striking failures of the past. The advantage of the professional attitude of mind is not only apparent in the domain of ethics, but it implies also a realisation of the nature and extent of any responsibility assumed, and a consequent judiciousness and thoroughness of work, which it would be unreasonable to look for in most cases of practical miners who suddenly assume professional duties.

CHAPTER XIII

THE INSTITUTION OF MINING AND METALLURGY

IN connection with the subjects of mining engineers and the risks of mining, it is worth while referring to the past work and probable future importance of the Institution of Mining and Metallurgy.

By reference to the proceedings attending its formation in 1892, it is seen that the object of the Institution was "the general advancement of mining and metallurgical science, and more particularly for promoting the acquisition of that species of knowledge which constitutes the profession of a mining engineer." There was a distinct field for such an institution in London, the centre of an empire so greatly interested in metalliferous mining as shown in the chapter on the Importance of the Industry. It is true that there existed a number of local societies in Great Britain which were interested in mining, or in metallurgical science: but these societies, from their situation and membership, and from the extent of the industries represented, were necessarily occupied chiefly with iron and coal; whereas the new institution set itself particularly to represent other mining, and other metallurgy, chiefly carried on outside of Great Britain, but largely controlled and financed there. Similar societies exist in the colonies and in other countries; the strongest and perhaps the most important being the American Institute of Mining Engineers, formed in 1871. In the case of the new Institution certain rules as to admission were adopted which do not prevail in most other similar societies, and which have the effect of giving at present a distinct value to membership, in the same manner as that conferred by the Society of Civil Engineers in its special sphere. The rules of entrance are as follows:—

Members.—Every candidate for admission into the class of members shall be not less than thirty years of age, and shall have been for at least five years in a responsible position with regard to, and shall be at the time of his candidature occupied in, practical mining or metallurgical work; or he shall prove to the satisfaction of the Council that he is a fit and proper person, by reason of his attainments, to become a member.

Associates.—A candidate shall be not less than twenty-five years of age, and shall at the time of his candidature be engaged in practical mining or metallurgical pursuits, and shall have been so engaged for a period of two years if he shall have obtained the degree of Associate of a recognised school of mines, and if not, for a period of not less than three years.

Students shall be persons not under eighteen years of age, who intend to adopt the profession of a mining engineer or metallurgist.

The growth of the Institution has been a rapid one, and it now numbers over 1,100 members, associates and students. It has published in its *Transactions* a great many valuable papers on mining and metallurgical subjects; and it has amongst its members many of the best-known mining engineers and metallurgists of all countries: as it is international in membership.

It is, of course, not pretended that every mining man who is qualified for election as a member is thereby marked as a fit and proper person to take any kind of responsible mining engineer's work; but the qualifications at least establish that he has had opportunity of both learning, and practising, responsible duties; and beyond this the individual character, judgment, and special experience must be independently considered, as in the case of all professions. At least, it is one step taken towards the gradual clearance of some of the unnecessary risks of mining, by affording the British public a register to be referred to in the case of prospectuses issued, with reports of reputed authorities on mining. In the chapter on "Ore in Sight," will be found described a second step which has been taken by the Institution, to clear up what has been a mystery to the public and a common means of fraud by the promoter. The Institution has, by its by-laws, power to remove from membership anyone guilty of unprofessional conduct; and this, with the general effect of its work and educating influence, will tend to the extending downwards, from the technically educated engineers, of the effect of the professional code of morals which is an incidental effect of their training. In the chapter on Mining Engineers more will be found on this subject of professional morals.

A matter in which the Institution has already done good work, is in calling attention to the deficiencies of the educational facilities for mining engineers in London, the centre of the empire, as compared with other places, and in suggesting remedies which have been recognised as valuable, and adopted in principle by the authorities.

That the public do look for some sort of title or indication of professional standing, is shown by the common practice of mining men to denote their responsibility by the addition of initials of various societies to their names. These initials, in most cases, only prove that the happy possessors have paid certain yearly and very moderate subscriptions to different societies, in exchange for which they receive copies of the published *Transactions*. The Institution of Mining and Metallurgy does therefore supply, as far as English company requirements go, a certain rough classification of known from unknown engineers and managers in mining and metallurgy, outside of iron and coal. This classification will in future become more complete, and still more useful, owing to the present rapid increase of membership.

It is not too much to say, that any person signing a mining report on which public capital is invited, should at the very least be able to show the experience required to qualify him for membership; and the advantages of membership are such as to insure application for it by nearly all of those who are likely to appear in English public prospectuses. By means of regular meetings for the reading and discussion of papers submitted to the Institution, the practical experience gathered all over the world is collected for publication in the *Transactions*, and is brought before students of the profession in London, thus supplementing their theoretical training by illustrations of actual work. It may fairly be said, that, except for initials denoting graduation from a recognised school of mines, there is no reason to attach any importance to initials used after the name of a man reporting as a mining engineer or metallurgist (outside of coal and iron), with the exception of those implying membership in the Institution of Mining and Metallurgy, viz. M.I.M.M.; and it is necessary to add, that this membership does not itself imply anything more than the qualifications necessary for election given fully above, and can therefore only be taken as a first step in any intended investigation. Past experience indicates clearly, that even a first step in the direction of investigating the qualifications of assumed mining authorities, would often be very profitable indeed to the public. The mystic letters M.A.I.M.E., often seen in reports and prospectuses, mean that the user pays two guineas per annum to the American Institute of Mining Engineers, for which he receives the best series of *Transactions* in the world as relating to metalliferous mining; but without any obligation to either understand them or read them. Neither the title of professor, nor the position of Government mining engineer, geologist, or surveyor, is any guarantee of the necessary practical experience and judgment to constitute a safe commercial guide in mining.

CHAPTER XIV

THE RISKS OF MINING

EVERYONE knows that mining is a risky business, but its importance and its great prizes are justification for many of the risks taken; and mining is by no means the only business which is surrounded by risks, in these days of rapidly changing conditions of trade, and increasing keenness of competition in every occupation. In the case of gold mining, at least one risk common to nearly every other form of production is avoided—namely, variation in the market value of the article produced. In considering the risks of metalliferous mining other than iron, it is desirable to make a sharp distinction between the necessary and the unnecessary risks; because much of the bad reputation of mining in the past, is due to causes by no means essential or natural to the business. No pretence will be made here to lay down rules for safe investment, but some conclusions will be attempted, from the facts given in preceding chapters, to indicate how the risks can be limited to something approaching a fair proportion to the gains to be aimed at.

UNNECESSARY RISKS

The chapters on Occurrence of Ores, "Ore in Sight," Mining Engineers, Valuation of Mines, and Mining Districts all bear directly on the danger of accepting as reliable every mining man named in a prospectus or mining report; and it can be shown that a large proportion of the money lost in mining by the public has been unnecessarily lost, from being put up on misleading statements of supposed authorities. In the first West Australian excitement a certain mining man came over to London, who reported on many mines which were then floated, and he was prepared, for a very moderate fee, to supply a satisfactory statement on any property for any prospectus: a report produced from a singularly retentive memory, stored with details collected in his walks over the sandy plains of Australia. Looking back over the prospectuses of that period, it seems incredible, that a man absolutely unknown here (and unfavourably known elsewhere) should be able during a few months' residence in London to become an authority, on whose reports some millions of capital could be raised from the public, although his statements were the laughing-stock of mining engineers and experienced mining men. His success was only the beginning of a line of similar public authorities, increasing in the magnitude of their operations, but with no clearer title to credit; some with no practical knowledge of mining, others with most unsavoury mining records in the United States or Australia. Some figures as to the results of this kind of guidance are given in the chapter on Mining Districts; from which it may be seen that the successes of the present West Australian mining are from causes and discoveries absolutely independent of the wild or wicked reports originally leading to the promotion of 673 English companies, with a capital of £99,601,828.

The one great means by which public authorities can be rapidly and improperly established, is the financial Press; and the part which certain papers have taken in this matter, is known to many as a disgrace to journalism. Because of frequent newspaper references to "the well-known expert, Mr. Chose," "the eminent mining engineer, Professor Dinge," or "the experienced mining man, Captain Thing," the public begin to take these authorities for granted. When companies are actually floated, these papers then proceed to assist in the inflation of the shares, which are already too high at par; and the inflation often precedes the flotation, and insures it. In some cases, of course, ignorance on the part of journalists may lead to improper notices of prospectuses; but in too many cases there is evident collusion with promoters, and interested motives are manifest. Late exposures in the courts have shown how well established is the art of working the unscrupulous papers, which the innocent public accept as guides to mining investment. The course of action in certain cases may be given by an illustration, for the benefit of the uninitiated. An interesting article on some district by "our special correspondent" appears, and is followed by others; these are of a general character, having no particular moral, but showing many promising features calculated to stir up interest, and casually mentioning one mine as clearly of great importance. Occasional later notices call attention to the progress and increasing value of this property, and of negotiations for its purchase by leading London financiers. One day the purchase is announced, and soon the prospectus is issued; a liberal advertisement appears, and with it a leading article pointing out the value of the mine, the character of its reports, the previous market successes of the promoters. The money article mentions active dealings in the shares at a premium, and gives the opinion of leading brokers that the shares are certain to double in price when something occurs, which is imminent. Now the property may be a fair one, vastly over-capitalised, or worth nothing much and still more over-valued; yet the public will buy shares if times are good, and run them up to several times par value, if reports and newspapers are properly worked. The special papers now considered, will give their help for calls or shares, or for straight cash for services rendered, under the general head of advertising; they will publish cables from "our own correspondent," which do not depend on electricity for their transmission; they will give valuable information as to the future from brokers, in their City articles; frequently inform anxious inquirers in their "Answers to Correspondents" (often before they inquire) that these shares should be bought; and give pious warning as to the immorality of "bear" operations, when the shares begin at last to go down. All this is matter of common notoriety in the City, and yet it remains a fact that one of the chief risks, and an unnecessary risk, of mining investment is the dishonesty of a portion of the financial Press of London, owing to the serious way it is taken and trusted by the public. The appearance of honesty is kept up by occasional onslaughts directed against companies or properties from which nothing more is to be expected; and by leading articles on the dangers of over-capitalisation, at times when the public are feeling sick and not thinking of buying any more shares, and therefore not needing any advice.

In connection with the great danger attending the placing of confidence in some portion of the financial Press, it is excusable perhaps to refer to the natural risk of buying shares in a time of boom, when prices are clearly inflated; but it is a platitude to say that the proper time to buy is when prices are depressed, and to sell when they are high; such a course is only followed by large operators, who require advice from no one. Nevertheless, in broadly considering the risks of mining—including in this the almost necessary buying and selling of shares—it is fair to say that the very common custom of buying because prices are high and likely to rise, and then selling because they have dropped, is a reason for losses which are not necessary in mining as a business or investment. These market variations are incidental to speculation, and have their own attractiveness and their own irregularities, quite irrespective of mining; subject, of course, in the case of each mine to the influence of a marked improvement, or an admitted falling off in value, from developments. The influence of the market can be ignored by few, because it represents the effects of prevailing conditions. Even mining engineers, of serene judgment and immaculate character, are unconsciously affected in the finer tints of their conclusions by the surrounding atmosphere.

In addition to ignorant advice, mischievous advice, and the tendency to invest under merely market influence, the risks of mining are unnecessarily increased by the British tendency to over-capitalisation in the early stages of a mine, and to raise the price of shares as soon as developments seem to show the original capital was perhaps justified; so that prices always keep ahead of intrinsic value, and an excellent mine may at no time really justify its selling price. This over-capitalisation is not generally so much due to the price paid the mine owner as to the excessive profit of intermediaries, and often, also, to artificial manipulation of the market. Some risk must be taken in the first purchase, as referred to more particularly under Valuation of Mines; but the price paid by British subscribers to the shares of the ultimate purchasing company is often exorbitant, and impossible of justification except by some undeserved piece of good luck afterwards.

NECESSARY RISKS

As owners of mines do not sell for the ascertained net value of the properties as shown by ore in sight, a first risk is inevitably taken in the excess price paid for future chances. In the case of a new mine, or a new district, it may be desirable to give a great deal more for the chances than for the estimated value, and the great profits in mining are obtained this way: while on a well-developed property, involving a large sum, the price to be allowed for future chances may be very much less than the established value. On values estimated by careful engineers, the purchase is at once converted into a prize by a little successful development; but if the engineer is chiefly occupied, from excess of caution, in not committing himself, there is the disadvantage of missing many good chances. There is, of course, a great difference between the recommending of a risk with a full knowledge of its character, and the optimistic readiness of the untrustworthy to take liberal chances with other people's money. Where careful men have discouraged investment in the early days of a mine, or a district, and results later have justified apparently the reckless and the dishonest promoters, who had no hesitation, it must not be assumed that there was error of judgment; for lucky discoveries, impossible to foresee in the earlier development, will upset all calculations; and it must not be forgotten that these undeserved successes are very few, compared with the disasters resulting from the following of unreliable guides.

In the matter of dealing in shares—which is the method of taking an interest in mining open to the general public — the question chiefly involved is the progress and promise of the mine, as represented by the market price of the shares. The market price does not by any means depend solely on the intrinsic value from time to time of the mine; but often, the changes in the prospects are only the starting-point for artificial fluctuations out of all proportion to any indicated alteration of value. Again, shares of a whole district will advance or recede together on general influences apart from individual merit, and perhaps in an opposite sense to individual prospects. The manipulation of shares by market operators, and the variations of whole classes of shares from general monetary or market conditions, are usually beyond calculation, and may be regarded as temporary influences which add the spice of speculation to the food of investment; for it is quite safe to count on a good mine being recognised in the price of its shares; and it is equally certain that nothing will keep up permanently the price of a worthless property. From the above it is clear that many of the losses in share transactions cannot be put down to the necessary risks of mining; and it is pretty certain that the great fluctuations which do occur in mining shares particularly, whether due to changes in the mines themselves or to outside influences, form no small part of the seductiveness of the mining business.

The important point is to have something more than mere luck to depend on for a satisfactory result in either investment or speculation; and for this, to select either mines of known value, or new properties held to be promising by safe authorities, and with capitals approximately reasonable in relation to their development. As these conditions are not very easy to determine amongst the many opportunities always before the public, the best general line of conduct is that of taking more care than customary in the past to see if the technical advisers and directors of companies are fairly reliable. The importance of luck is not to be underrated, for nothing but luck will explain many of the great successes in mining. Fortunately luck is not confined to the rash and the undeserving; unexpectedly rich developments are, in fact, more likely in a good property than in a doubtful one, and their absence does not mean complete failure in the first as it does in the other. Usually, in English companies, market prices of shares keep up to figures which yield only about 10 per cent. by the dividends being paid, or shortly anticipated. There are many mines which, from their character, ought to pay 20 per cent. and higher, to justify holding; while in the Transvaal, lower rates of interest than in any other part of the world are often safe. Calculations as to the life of mines, outside the Transvaal, are usually only very approximate, and subject to sudden changes from the course of development: and the opening of a new level, or the cutting of a fresh body of ore, has a different meaning and promise in different mines. For example, three mines could be named, situated close together in Western Australia, in which the occurrence of the rich ore is entirely distinct. In one the ore runs in long shoots persistent in length and depth; in the second it runs in a rich pipe of limited cross-section, dipping diagonally across the property; in the third mine, the ore is found in bunches of varying size and irregular distribution. Now the cutting of equally rich ore in a new level of these three mines, means in each case something different from a similar development in the other two; and as a consequence, an equal proportional rise in the price of the respective shares, on the news of the discovery, is unwarranted. As an example of sudden and unforeseen changes which entirely alter the prospects of mines, and consequently greatly affect the value of their shares, attention is called to an actual well-known case of two mines on claims adjoining, but each working its own vein, or series of veins. The rich vein of one of the properties had been dipping towards the ground of its neighbour for a depth of 1,100 feet, and everything pointed to its crossing the vertical boundary line at once, when it changed its dip, and ran back into its proper claim, where it has been followed to a depth of over 1,700 feet, and with no further signs of a return to its original intention. Had this vein continued its dip, as is usual with veins, the relative values of the two properties would have been entirely changed.

Of late a good deal has been written about the incompetence of directors of mining companies, and this, too, by papers far more responsible to the public for its losses than are directors as a whole. It is true that English companies are occasionally very unfortunate in their directorates; and, what is more important, through ignorance of directors such companies suffer sometimes from poor management at the mine, selected by the board. If a mine is good, and the local management is good, a very ordinarily respectable board of directors will suffice for all business purposes of the shareholders; and a number of examples of a happy family thus constituted, could now be pointed out in London. In some such cases, there are directors who firmly believe the success of the mine is due to them, or at least was foreseen by them when they blindly entered on their duties; but this is a harmless delusion, affording great pleasure to the holders, and inflicting no real injury on the shareholders. The question of directors is therefore comparatively simple, and need not be a serious risk, because nothing more than ordinary honesty and business sense is absolutely required; and the public should be as well able to judge if these are secured on the board of a mining company, as on the board of any commercial company. There has been much abuse of late showered on what are known as "guinea pigs"; and certainly some mines have suffered greatly either from ignorance or dishonesty of certain directors, who are supposed to come under this description; but the harmful ones are certainly not so many as is sometimes implied, and it is by no means fair to regard numbers of honourable men, who avowedly take directorships for the fees attached, as therefore deserving of blame. A man of no very active business occupations, can fill the duties of a director on several companies with perfect conscientiousness; and his extended experience may be useful to all his companies—if he is fitted to be a director at all. There are fossil directors in London on some good companies, as there is petrified management at the mines; these, however, bring no disgrace on mining: they diminish dividends perhaps, or spread them over a longer series of years than necessary; but in such cases the shareholders are often quite happy, and posterity will have something also. The really important matter of management at the mine, and of policy of the company in its expenditures at the mine, should not depend entirely on the ordinary company directors, for on these subjects professional advice is necessary. This professional advice can now easily be obtained. There are many experienced mining engineers now resident in London, whose services can be obtained as consulting engineers to boards of directors, at a cost of a few hundred pounds a year (often no more than paid to a director), and who can supply the technical knowledge unnecessary in the ordinary director. In the past, one danger to mining companies has been the presence on the board of a director who thought he was also an "expert," and who has taken advantage of the little learning which is proverbially dangerous, to influence colleagues who modestly professed less. It is not at all a difficult task now for a board of business men, with no special knowledge of mining, to get the name of a professionally educated mining engineer to assist in their work, simply as consulting engineer, not as director. It is not necessary at all for the engineer to be on the board, nor to manage the company. In preceding chapters much has been said on the subject of mining engineers; and it is worth repeating here, that the dishonesty and incompetence which have given some false ideas as to the risks of mining, have been in very small part due to professional mining and metallurgical engineers; but in nearly all cases have their origin in charlatans, practical miners, or enthusiasts, all recognised by the initiated as such, at the time of their successful operations on the public purse. In the law courts, there is a readiness on the part of both bench and bar to accept anyone's statement as to being a mining engineer, and therefore to treat all the profession as unreliable.

As in the wise providence of Nature it happens that we can discover at times a useful purpose effected by what we consider as vermin, so there may be seen some advantage in the final results of the work of self-constituted "experts," ignorant enthusiasts, rascally promoters, and a venal section of the Press. Mines and districts of value have been opened in the past, which might long have awaited development if dependent for recommendation on the most careful mining engineers. If, with the progress of public education, it becomes really difficult for the unreliable to get a following, the mining engineers proper will be more in need of encouraging to recommend fair risks, than in any other direction; because the greatness of the industry justifies risks, and it cannot be actively carried on without taking them. However, this possible future scarcity of encouragement to the public to take risks, is not likely to need early consideration.

APPENDIX A

THE INSTITUTION OF MINING AND METALLURGY

PRESIDENTIAL ADDRESS BY HENNEN JENNINGS

19TH MARCH, 1903

I GREATLY value and deeply appreciate the honour that has been conferred upon me by my election as President of this Institution, and it is with great regret that I find I shall not be in London on the date of the delivery of my address to take up all duties connected with my high honours.

Since my appointment as President-elect of the Institution, my abode and thoughts have to a very large extent been on the Witwatersrand goldfields; and it thus seems to me fitting—and, I trust, productive of the most usefulness—that I should confine my address to the consideration of these goldfields, and the problems directly connected with them.

During the past three or four years the attention of the whole empire has to a large extent been focussed upon South Africa and the region of these fields; and the fact that the Witwatersrand is the greatest producer of a metal that binds all industries together will, I hope, free the selection of the subject of my address from the criticism of parochialism.

At the Annual Dinner of this Institution, in October, 1901, I stated:—

"In my experience of gold mining, extending over twenty years, and carried on in the continents of North and South America and Africa, the difficulties of obtaining this royal metal have certainly been most indelibly impressed upon me; also its coquettish, alluring capriciousness; but a still greater fact that has slowly dawned upon me is—that the golden stores for which man so strenuously battles are not guarded by dragon or flaming sword, but merely by an account-book. In this, Nature's ledger, an account is kept, not with the individual, but man as a whole. On one side are put the varying amounts of energy, work of hand or brain, that have been given by the different units of man; on the other side the amounts of gold given out by Nature. From him Nature demands her full dues, even charging high interest for her services as accountant. The balance-sheets are not regularly issued, but, on the whole are fairly made. What I mean is: that successes in the various gold fields of the world have been balanced by the failures, and that the mining man has had to pay as much (even more) in labour for the gold he obtained, as that gold could purchase in labour in other fields."

I further, and perhaps rashly, indulged in metaphor as follows:—

"I claim that gold coins can be truly called storage cells, into which man can pump through his dynamo (mining industry) the labour of his hands and the subtle energy of his brain, and store them for future and concentrated use under the name of latent man-power. To prevent the cells running down it is necessary to keep the gold mining dynamo running—when it stops the value of the cells is but short-lived. Excessive running disintegrates the cells. This is only stating that when gold becomes too scarce it has but little value, and when too plentiful, none. One of the marvels of the industry is the adjustment and regulation by Nature's account-book of the force going into the cells.

The history of gold mining for thousands of years shows that this has been so regulated at the central station that the cells have neither died out nor entirely burnt up."

Since giving utterance to these ideas, the South African War has been ended, and has shown that, in the struggle lasting nearly three years, some 22,000 men lost their lives on the British side alone, and that the expenses to the empire must have totalled £250,000,000.

As a contribution to the cost of the war the Transvaal Colony has assumed a debt of £30,000,000. It has incurred a further debt of £35,000,000 to take over the assets and liabilities of the South African Republic, and to supply funds for the further advancement of railways and other improvements in the Colony.

The war has been ended some eight months, but owing to the difficulties in the readjustment of the country and the scarcity of native labour, the yield from the mines is only about 50 per cent. of what it was immediately before the war.

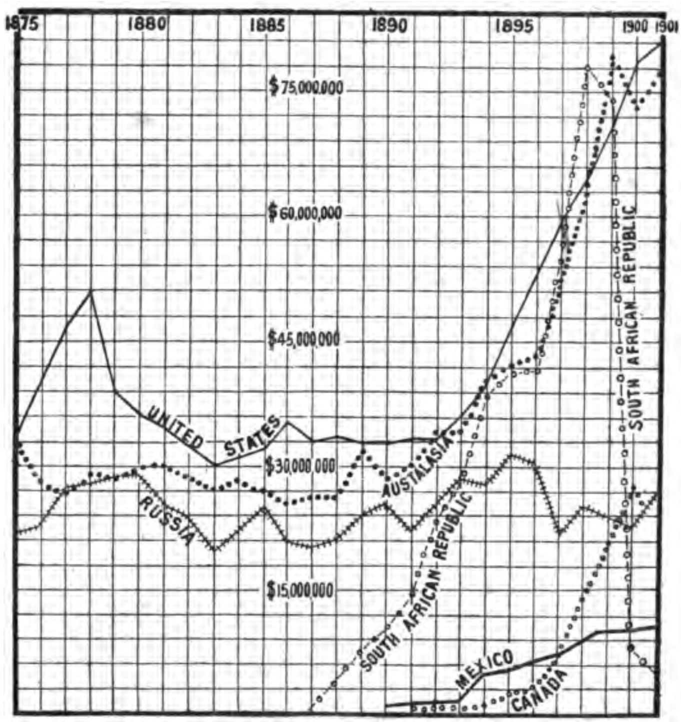
These facts certainly seem to emphasise the foregoing ideas, but naturally direct proof of such imaginings and metaphors is utterly out of the question, and I only give them with the hope that they may afford some interest and food for thought in connection with the statistics that follow.

Before going into details in connection with the Witwatersrand fields, it would be well to take a brief survey of the past gold production of the world, and for this purpose I quote as follows from Dr. T. Kirke Rose's book on the Metallurgy of Gold:—

"The production of gold in ancient times cannot be closely estimated, but, judged from a modern standpoint, it was probably very small. In the Middle Ages, however, between the fall of Rome and the discovery of America, the production was far smaller than before, and Jacob observes that in this period 'the precious metals were sought not by exploring the bowels of the earth, but by the more summary process of conquest, tribute, and plunder.' Even after the exploitation of the New World began, the output of gold was for many years much too small to satisfy the cupidity of the conquerors. The development of the mining industry was prevented by the ruin and destruction of the natives, and by the almost incessant irregular warfare waged against the Spaniards in America in the sixteenth century, first by the Dutch and later by the English. Fifty years elapsed after Columbus discovered America before the annual production of gold reached £1,000,000, and even at the end of the seventeenth century Soetbeer estimates that it was only £1,500,000. The discovery and working of the rich Brazilian placers during the next half-century raised the annual product to over £3,500,000 in the period 1740–60 (Soetbeer), but as these deposits became exhausted, the output again fell off, and in the period 1810–20 had again sunk to about £1,500,000 per annum. The gradual development of the Siberian placers was the main cause of the subsequent steady increase in production up to an average of £7,500,000 per annum in the period 1841–50, and this was followed by a sudden rise consequent on the discoveries in California and Australia. The maximum output from the rich placers of these countries was reached in 1853, when the world's production of gold is estimated by Sir Hector Hay to have been £38,000,000. After falling to £21,000,000 in 1863 (Hay), the output remained nearly stationary until about the year 1888, when, from various causes mentioned below, the production again began to increase, and in 1899 reached £64,000,000, the greatest amount on record."

To bring visibly before us the great increase and sources of the gold production during the past twenty-six years, I take the liberty of extracting from *The Mineral Industry* the World's Gold Production Chart (see page 115) for the period 1875 to 1901.

THE WORLD'S PRODUCTION OF GOLD.



From this chart, and the tables in connection therewith given in *The Mineral Industry*, it is seen that in the last twenty-six years the annual production of gold in the world has increased 170 per cent.; also that the dominions and colonies of Great Britain will supply about 60 per cent. of the vast current output of this metal when the Transvaal Colony produces on the same scale as before the war.

Some apprehension may be felt that this great increase in the production of gold will militate against its usefulness as a standard of value. But investigation of trade statistics and business enterprises during the period under review, as well as the great leaps shown in the output of other metals such as steel and copper, show that the demand for gold has kept pace with the supply; and the facts that will be presented go to prove that even in the most promising gold fields of the world man must on an average fully pay for his gold.

The following historical facts, chronologically arranged, are some of the most important in connection with gold in South Africa:—

1868.—Carl Mauch mentioned the existence of gold near the Oliphant's River.

1870.—Gold was found in the Murchison Range.

1873.—Gold was found in the Lydenburg District at Pilgrims' Rest.

1882.—The De Kaap goldfields were started.

1884.—The Struben Bros. started quartz mining on the farm Weltevreden, in the Western District, and started a 5-stamp battery.

1885.—The Sheba mine was discovered and Barberton founded.

1885.—The first gold from the conglomerate beds of the Witwatersrand was panned.

1886.—Johannesburg was founded.

1887.—The first stamp mill was started working banket.

1887.—Coal was discovered at Boksburg.

1887.—Stock Exchange opened in Johannesburg.

1888–89.—First boom.

1889.—Formation of Chamber of Mines.

1890.—First cyanide test works, and start of the Robinson cyanide works.

1891.—Customs chlorination works at the Robinson mine.

1892.—Extensive deep-level companies formed.

August, 1892.—Opening of railway to Johannesburg *viâ* Free State.

1893.—Rand Victoria bore-hole, reef found at a depth of 2,343 feet.

1894.—Direct treatment of tailings by cyanide process.

1895.—Second boom.

1895.—Bezuidenville bore-hole, reef at 3,127 feet.

December, 1895.—Jameson Raid.

1896.—Extensive erection of slimes plants.

1897.—Industrial commission of inquiry.

1899.—Deepest shaft (Catlin), 3,700 feet.

October, 1899.—Declaration of war.

1901.—Three companies restarted milling in May.

1901.—Bore-hole, Turf Club—South Reef cut at 4,804 feet.

May, 1902.—Peace.

January, 1903.—Total expense of war in South Africa, £250,000,000.

January, 1903.—Transvaal and Orange River Colonies agree to debt of £65,000,000.

In December last the Transvaal Chamber of Mines appointed a committee of the Consulting Engineers of the various leading financial houses, to prepare statistics and a statement regarding the Witwatersrand goldfields for

Mr. Chamberlain and Lord Milner. These statistics were compiled up to date of 30th October, 1902.

These are the most complete and accurate statistics yet attempted for these fields. In their preparation the aid of almost all the engineers, managers, and secretaries of the mines has been enlisted, and the records of the Chamber of Mines and State Engineer's Department have also been drawn upon.

The statement begins with a short general description of the fields, showing the main characteristics of the deposit, its extent, theories of deposition, security of continuance, results of past working, equipment, possible expansion, and a thorough discussion of all aspects of the labour problem.

In addition to the text of the statement, some twenty-nine statistical exhibits were included.

By extracts, either verbatim or summarised, from this statement, it seems to me that the salient features and records of the Witwatersrand can be obtained up to date, and in the most condensed way. In quoting from it I feel I am giving the most recent and fullest information obtainable, and, as one of its drafters, it appears befitting for me to do so.

"The Witwatersrand goldfields are located on an elevated plateau, nearly 6,000 feet above the sea. The Witwatersrand (or whitewatersridge) projects somewhat above the plateau, and the outcrop of the conglomerate reefs can thus, in a measure, be said to be the dividing watershed between the Atlantic and Indian Oceans, the tributaries of the Vaal River draining into the Atlantic, and those of the Limpopo or Crocodile River to the Indian Ocean. The conglomerate beds of the Witwatersrand are composed of quartz pebbles bound together by a silicious cement containing iron pyrites. The name 'banket' has been given to the conglomerate from its general resemblance to an almond sweetmeat with this Dutch name, which, however, refers specially to the ore taken from the oxidised zone, which in the early history of the fields was called 'free-milling,' and was found to extend to only a limited depth. The gold contained in the conglomerate is not often visible to the naked eye, occurring almost invariably in the matrix, its existence in the pebbles having been recognised only in rare instances. The gold is for the most part in very fine particles, and when examined under the microscope shows sharp crystalline structure, giving no evidence of being rounded and moulded by attrition, as is observable on examination of gold found in alluvial deposits. There are several series of these conglomerate beds in planes more or less parallel to each other. The most common designation of them, starting from the lowest geological horizon, is as follows: Du Preez series, Main Reef series, Bird Reef, Kimberley series Elsberg and Black Reefs."

The Main Reef series is one on which mining has been most successfully conducted, in general two adjacent parallel beds being exploited, though of unequal gold contents. There are often found even three or more separate seams or conglomerate beds that justify exploitation, and even in so-called high-grade mines there are large quantities of low-grade ore. In addition to the mines working on the main reef series, some thirty-four companies have been worked on the other reef series, and produced about £3,000,000 return of gold, but only £483,000 in dividends.

"The distance along the strike of the Main Reef formation from Randfontein on the west to Holfontein on the east is some sixty-two miles, throughout which extent the reef has been almost continuously traced. Of this area, the central section for a distance of about twelve and a quarter miles has produced about 76 per cent. of the gold won. Conglomerate beds have, however, been traced over a far greater area, and correlated by geologists with the

Witwatersrand series. It has been stated that there is—

Continuity proved by outcrops and boring for	.	164 miles.
Continuity concealed by more recent measures for	.	123 ,,
Continuity interrupted by faults and dykes for	.	31 ,,
Making a total of	.	318 miles.

"As the subject of the genesis of the conglomerates and gold contained therein is open to much difference of opinion amongst geologists and engineers, it will be unprofitable to attempt to deal with it in detail. The most generally accepted theories seem to be:

"That the conglomerate beds and enclosing sandstone and quartzites were sea-shore deposits, formed during subsidence of a coast line. That after their deposition and consolidation the banket-bearing strata were folded into anticlines and synclines. North of Johannesburg subsequent erosion removed the anticline. The deposition and erosion in connection with the syncline have been such that a statement of a basin-shaped deposit has much justification. The beds have been much subjected to fault and dyke action, which has broken them up extensively in places.

"The origin of the gold within the beds can be considered as: First, that it was deposited prior to the formation of the conglomerate; second, contemporaneously with the formation of the conglomerate; third, subsequently to the formation of the conglomerate.

"The advocates of 'prior to' assume that the gold and pebbles alike are the products of erosion or denudation of an older formation containing quartz veins.

"No 2 requires the hypothesis that the sea was very shallow, and contained a solution of gold and iron sulphide, coupled with precipitating agencies.

"No. 3.—This is the impregnation theory, assuming the gold and pyrites to have been deposited in the beds by infiltrating solutions, the mineral solutions seeking the planes of least resistance, *i.e.* filter bed of the banket, the desposition of the gold and other metals being thus brought about as in quartz veins. This latter theory is the most accepted by engineers here.

"The classification of the Witwatersrand beds seems a simple matter when looking at any one section, but in reality is complex. Even in the Main Reef series there is great variation in the number, distance apart, and thickness of the beds, and there is much diversity of opinion regarding their correlation, on account of extensive and complex faulting, especially in the extreme eastern and western sections.

"The pay banket may vary in thickness from a few inches to 15 or 20 feet. The encasing rock may be soft sandstone or hard quartzite; the dip of the beds may vary from vertical to horizontal; the mine may be wet or dry. The depth from which ore is hoisted may vary from 100 to 200 feet up to 2,000 or 2,500 feet. The amount of waste rock—that is, quartzite or other rock containing little or no gold, which is dislodged by blasting operations—that is sorted out from the reef proper, varies between 0 and 40 per cent. This process of sorting out, as practised here, amounts simply to the rejection of valueless material. The mining area may be a home for faults and dykes, or the reefs may be found free from serious disturbances.

"Thus it is unreasonable to expect uniform cost of extraction—when comparing one mine with another—any more than uniform yield. The great reputation these fields justly have for security and regularity is in gold mining, merely relative and based on the law of averages. Gold mining as a business in other parts of the world has been recognised as the acme of speculative investment. Here, though capricious as units, the mines are as a whole regular, within certain fixed limits; and it is perfectly true that *greater* reliance can be placed on the continuance of the deposit than has ever before been known in gold mining, and therefore large preparatory outlays on the basis of a staple industry are more justifiable.

"The investor has gradually realised that, in order to ensure the best results and put his property in a position to make profits with the low-grade ore, a large amount of development work, big mills, cyanide works, and great capital outlays in many directions are required.

"It has been estimated that on an average it must have cost companies at the rate of about £5,000 per stamp for development work, and all capital outlay connected with their mines. There have been about 6,000 stamps crushing at one time on these fields, which would make the total capital outlay for producing companies figure at about £30,000,000. This makes no allowance for non-producing companies, or for the great outlays in Johannesburg in connection with central administrative control. A check on this estimate is shown by an exhibit, in which the capital expenditure for sixty-eight companies is given, and it is seen that on a stamp basis this works out at £4,811."

The exhibits further show that some 120 companies have been formed with a nominal capital of about £57,000,000, and that their market valuation at the end of December, 1902, stood at about £173,000,000; also, that in the equipment and development of some 111 companies about £37,000,000 had been spent; that 71 companies had erected some 6,560 stamps; that only 47 of these companies had as yet paid dividends; and that the total dividends paid up to date amounted to nearly 19½ millions sterling; thus showing that, altogether, some 17½ more millions have been put into the gold mining business as betterments than have as yet been taken out in dividends.

The records show that the gold obtained from the Transvaal from 1884 to October, 1902, amounted to about £95,000,000, of which the mines designated as "Main Reef" produced £83,000,000, or about 88 per cent., and that thirty-four other companies of the Witwatersrand fields produced some £3,000,000, thus leaving only about £9,000,000 for other sources in the Transvaal. The total dividends from the Witwatersrand fields from their commencement up to date equal about £20,000,000.

In the analysis of the seventy-nine Main Reef companies from their start to October, 1899, it is seen that these companies crushed 33,828,692 tons of ore, produced £70,686,590 of gold (41*s.* 9·4*d.* per ton), and distributed in dividends £17,962,366. Subtracting dividends from yield, it is found that the costs on this basis average 31*s.* 3*d.* per ton, and that 25 per cent. of the gold won has been distributed in profits.

The companies in the central section, with lateral extent on the strike of 12½ miles, have produced 76 per cent. of the gold won, and 88 per cent. of the dividends declared. The classification of the mines according to grade is also a most vital and interesting feature, and is shown as hereunder:—

No. of Companies.	Tons Crushed.	Yield per Ton.	Dividends per Ton.
			s. *d.*
13	2,155,702	under 25*s.*	0 4·5
12	3,378,559	,, 30*s.*	0 9·1
12	7,792,868	,, 35*s.*	7 10·7
11	6,327,879	,, 40*s.*	7 6·1
19	8,894,363	over 40*s.*	11 2·5
12	5,279,321	,, 50*s.*	27 10·1
79	33,828,692		10 7·4

Another feature of the statement to which I will draw attention is that of deep-level companies, which is explained as follows:—

"A deep-level company is a company holding ground to the dip or in the deeper horizons of an ore deposit, the outcrop area of which is held by other parties or corporations. The distance from the outcrop of the reef to the beginning of the deep-level company is entirely dependent on the width of ground taken up by the outcrop company, and is not defined or limited by law. Some deep-level companies have been formed where the distance from the outcrop to their northern boundary has been less than 400 feet, and others several thousand feet. Further deep-level companies have been formed to the dip of previously formed deep-level companies, and are then known as the second row of deeps; and, again, companies exist to the dip of these, and are known as the third row, and so on.

"On these fields some fifty-three deep-level companies have been formed, of which fourteen have reached the producing stage. Some eighty-one deep-level shafts have been sunk in the aggregate 88,405 feet; of these, fifty have intersected the reef.

"Another exhibit shows that the various groups estimate a further expenditure of £50,400,000 in connection with deep levels and other projected developments.

"The greatest depth from which ore is now being extracted is at the Robinson Deep, where stopes are worked at a vertical depth of 2,400 feet; the reef at this depth has all the normal characteristics observed in outcrop mines. The ultimate depth to which mining will be conducted on these fields is dependent on the grade of ore met with, and the working costs, the latter being influenced by labour and supply conditions, depth of hoisting, and the temperature and water encountered as depth is attained. At present the outlook for the last two of these factors of working costs is most favourable, and engineers on these fields are now discussing mining as possible at depths of from 6,000 to 12,000 feet."

The foregoing gives a summary of some of the salient features and records of these fields, but to rightly appreciate them a more thorough study is necessary and desirable. . . .

The early optimistic forecasts of Penning, Dorsey, and others, of the value of the deposit, have been verified in a remarkable manner. The first careful estimate of Hamilton Smith of future yields, based upon the data of 1892, though hopeful, now appears pessimistic when looked at in the light of more recent accomplishments. Subsequent writers have most ably and completely dealt with all conditions, phenomena, and statistics of the fields. But one great fact must not be lost sight of, one which all engineers agree upon, viz. that when the Witwatersrand fields were first discovered, a similar formation had never been worked in the history of practical gold mining.

Thus, in beginning the development of the fields, the practical miner, or mine owner, had no previous experience to guide or steady him, but had to make precedents for himself. There was thus great justification for both inordinate hope and depression, and little reason to look with reverence to professional dicta.

What the geologist and expert might say at first, even though logical and true, was at best in the early days but able prophecy.

At the start an able, practical, and conscientious engineer could only tell his principals his hopes or fears, and not fortify them in their policy by giving positive opinions based on previous practice.

Many prophetically inclined experts soon found their way to, or created themselves on, the fields. There was much loud talking for and against the Rand, and little good practical work in engineering was done at first; thus experts both good and bad got into disfavour with many, and were doubly damned by some.

Without imagination, divination, and hope, the mining man can never be considered great, but he must use these with moderation and patience, and go step by step; things must be looked at as they are, not as they are in the end wanted and expected.

It was thus necessary for the early conscientious engineer to educate first himself, then his principals. As his belief in the magnitude and permanence of the deposit increased, so justification for greater and greater expenditure became apparent. The education of himself in this regard was far easier and more rapid than that of his principals; but in justice to the latter it must be said that the final education of the mine owner, as to the wisdom and necessity of opening his purse wide for large and improved methods of work, is here greater and more complete than in any other goldfield of the world.

To rightly see what Nature and man are responsible for in connection with the past and future success of these fields, it will be necessary to look squarely in the face *the valuation of a gold-mining proposition.*

There seem to me to be four vital factors in the problem:—

1st. The original unalterable amount of gold, together with the nature and extent of the formation in which it is found.

2nd. The percentage of extraction attained and obtainable.

3rd. The cost necessary, or current, for its extraction.

4th. The time or rate at which the ore is, can be, or is estimated to be, extracted.

All these factors are related and necessary for obtaining any estimate of present values. The first is the dominant one and is controlled only by Nature. The others, though dependent on the first and each other, are variable between certain limits, and are controlled by the intelligence, energy, and power of man, and also by the intensity and time over which he exerts these forces. Let us first regard some of the factors as given by the Witwatersrand fields.

No. 1.—The determination of No. 1 has only been possible by degrees, and is only partially known even at present. Work on the Witwatersrand was started in 1886, just about the time of the boom in the Barberton district. The nature of the deposit lent itself to easy and excessive activity in prospecting. By mere inspection no reliable idea of the value of the ore is possible. The first mill tests were made rightly on the best ore that could be found at the surface at such mines as the Robinson, Ferreira, Crown Reef, Llanglaagte, Wemmer, Salisbury, etc., and these gave sensational results and encouragement. It was soon possible to trace the banket formation for some forty miles. Picked hand specimens of banket were very hard to distinguish from one section of the forty miles to the other. There was no other way of determining the value of the relative sections except by pan, assay, and practical work.

Pannings and assays have a certain value in skilled and cautious hands, but in ignorant and sanguine ones they give very dangerous results. It is only by dealing fairly and carefully with many samples, making proper discounts for thickness of reef, recovery, etc., and applying the law of averages, that useful and reliable information can be obtained from small samples and assays. In almost any section it was practicable to obtain isolated promising pannings or assays from some parts of some of the ore-beds. It was only by time and the stamp-mill that the legitimate limitations of the pay areas have in any way been arrived at. And even yet this is by no means determined, as the extent of the conglomerate beds is immense, and the gold contents most variable. It is thus seen that the final extent to which they will be worked will depend on the amount of ore that can be treated at a profit. The lower the working expenses, the greater this amount will be, and this, in a way, will lower the average yield.

The natural advantages and disadvantages of the Witwatersrand fields can be summarised as follows:—

Advantages:—

Great extent of deposit.

Certainty of moderate yield on an average over large areas.

Close proximity to extensive coalfields.

Healthful climate.

Small amount of water in the mines, but an average rainfall of nearly 30 inches.

Small increase in temperature due to depth, tests of the increment up to date showing only 1° F. for 208 feet.

Comparatively small amount of timber required in the development and exploitation of the ore.

Disadvantages:—

The extensive faulting and dislocation of the conglomerate beds.

The thinness of the pay seams in certain sections, necessitating the mining of non-payable rock and a system of sorting.

The association in very fine particles of the gold with the matrix in such a way as to render concentration devices ineffective.

The unfavourable average dip of the beds (30°) for cheap exploitation.

Distance from coast in connection with altitude and course of supplies.

Sparseness of population per square mile, with the proportion of one white to five natives.

It has been seen that the results of past workings of these conglomerate beds have shown a return of about 42*s.* from a generous sample of 33,000,000 tons.

No. 2.—*The percentage of extraction attained and obtainable.*—The banket or conglomerate ore of the Witwatersrand at first presented very serious difficulties for obtainment of high extractions. The gold is found in such fine particles, and so associated with its matrix, that the ordinary amalgamation process in connection with stamp mill and copper plates—which was alone first used —only accounted for 50 or 60 per cent. of the gold in the ore. It is to be remarked that in the oxidised zones the results obtained on the plates were very little better than in the pyritic sections, in which the greatest amount of ore is found.

Many processes have been tried on this ore with varying success. In connection with amalgamation, various methods of making the tables, charging the mercury and keeping it "quick" and effective, have been tried; in connection with the latter the Molloy process employed both electricity and sodium.

Naturally, when it was found out that the amalgamation process was so imperfect, the first thought was to supplement it by concentration and subsequent treatment of the concentrates. In this connection it may be stated that blanket strakes, canvas tables, buddles, Australian and Hungarian shaking tables, Schüler tables, gilt-edge concentrators, Duncan concentrators, vanners, hydraulic classifiers, etc., have all been tried in connection with the obtainment of concentrates; and, in connection with their treatment, Wheeler and Budan Pans, Newbury Vautin, Polloch, Hungarian and Plattner chlorination processes have all been experimented upon. Extra extraction was obtainable by these methods, the most successful being in connection with vanners and the Plattner chlorination process, the latter demonstrating that, if all the gold could be got in the form of concentrates, there would be no difficulty in obtaining over 95 per cent. extraction.

The difficulty was that all concentrating appliances proved ineffective, and the pulp passed over them rich enough in gold to warrant further and complete chemical treatment.

The first public test of the McArthur-Forrest cyanide process on these fields was made by myself and an assistant in June, 1890. The experimental plant was constructed on the agitation principle, and, though it gave good results in extraction, the working costs were prohibitive.

The first cyanide plant on the percolation principle was started at the end of 1890, at the Robinson mine, and as then designed contained all the vital principles of cyanide practice, but could be, and has been, much improved upon in many matters of detail. The costs were at first as high as 13*s*. per ton treated, but to-day, at the same mine, with a higher extraction, working costs for cyaniding have been reduced to 2*s*. 6*d*. per ton.

The cyanide process was gradually but steadily extended. The Nigel Company, in 1892, were the first to deal successfully with the problem of pyritic tailings.

In the evolution of the cyanide process the following have been considered the principal improvements:—

Adoption of vats of great capacity; at the starting of the practice on these fields 23 feet diameter vats were the extreme size known in chlorination practice; now vats of 40 and 50 feet diameter and 10 feet deep are common.

The bottom discharge arrangements for the vats in connection with the use of iron are also noticeable details.

The adoption of direct filling in connection with an hydraulic classifier, by which the sands could be at once taken to treatment tanks, and the process changed from an intermittent system into a continuous one.

The final successful treatment of the slimes and concentrates, and by the combination of all methods by which at least 95 per cent. of the pulp leaving the mill is subject to continuous chemical treatment; and an extraction in this connection of over 80 per cent.; and, by the combination of amalgamation and chemical treatment, 90 per cent. of the original value of the ore is often obtained.

In designing cyanide plants it has been found to be false economy to overpress them, and it is a good investment to gain extra extraction at the expense of higher first cost; thus, in some of the plants erected, some £90,000 has been spent in connection with the cyanide and slimes work for a 200-stamp mill.

Besides the McArthur-Forrest process proper, variations have been tried in the methods of precipitation of gold from the solutions by means of electricity with different anodes and cathodes. The Siemens and Halske method employed iron anodes and lead cathodes. Acetate of lead is being used to form a zinc-lead couple for the precipitation of gold from very dilute solutions of cyanide of potassium.

As it might be invidious to mention names in connection with the improvements of the reduction plants on these fields, I will only say that remarkable ability, keenness, and industry have been displayed by a great number of very able workers. The remarkable benefit to these fields in connection with all the improvements in the cyanide process is shown by the fact that now, with the best up-to-date plant and management, the above-mentioned percentage results are obtained, these figures being checked by careful sampling and assaying.

In the testimony given by myself in the Industrial Commission of Enquiry in 1897 is the following:—

"Another interesting feature to be noticed from the tables is that the yield from the secondary treatment is shown to be 12*s.* 1·14*d.* per ton on the basis of the tonnage milled, and working costs, 3*s.* 2·34*d.*, the profit from this treatment, therefore, figuring at 8*s.* 10·8*d.* From this it is clearly evident that, of the total profit of 9*s.* 7·87*d.* obtained by the combined treatments, no less than 8*s.* 10·8*d.*, or 92 per cent., came from the secondary treatment, without which obviously only an extremely small number of the very richest mines here could ever have paid dividends. This is a strong illustration of what intelligent metallurgical and engineering skill has done for the prosperity of these fields."

The percentage of profit roughly varies inversely to the yield of the ore, so the lower grade mines are the greater gainers by the cyanide process.

No. 3.—*The cost necessary, or current, for its extraction.* The fundamental factors entering this section are:—

The efficiency of the management and labour.
Cost of labour and supplies.
Scale of working and mechanical appliances employed.

Prior to 1890 the management of the mines was subject to very severe criticism, and was much demoralised by share speculation, then very prevalent. During the comparative depression in the share market from 1890 to 1895, earnest efforts were made to demonstrate by results the worth of the mines, and every effort was made to obtain able, competent, and experienced men in all branches of managerial and technical departments. This resulted in giving an immense impetus to good management and the importation of high-grade labour.

The labour problem is greatly handicapped by the lack of any great natural labour reservoirs in the country, the whole population of South Africa being estimated at only 6,000,000, and this over about 1,500,000 square miles, thus only approximately four per square mile, with a ratio of one white to five natives.

Before the advent of the first railway to Johannesburg, in 1892, the cost of supplies for the mines and the necessities of living for all classes was much higher than even at the present time.

The exhibits sent in with the engineer's statement show that the freight charges alone from the coast add as much as:

110	per cent.	to the	cost of	steel plates,
436	„	„	„	cement,
123	„	„	„	deals, and
356	„	„	„	pitch pine,

to the original cost in Europe; and, in comparing retail rates ruling in Johannesburg and England, it is seen that the cost of bread, butter, sugar, and meat is doubled, and other food stuffs are even much higher in proportion. The average cost of living for a workman on a mine, with wife and three children, is estimated at £24 10*s*. per month.

There is no doubt that in process of time the cost of living on these fields will be greatly reduced, but it will take time. Even if all Government duties and railway rates on all supplies were reduced to the minimum of other countries, the landlord and retail dealer, with their invested capital and wage obligation to their mechanics and salesmen, have to be reckoned with, as well as the agriculturist and his hired man. The high-wage system runs through all occupations, and they are so interwoven that it requires the concerted action of all to achieve right results in any one department. This tangled skein requires time and perhaps much struggling and suffering for its unravelment.

The native populations of South Africa are a virile race; they have not been, and cannot be, swept away by the march of civilisation, for they seem capable of surviving even its vices, and are protected by British rule against destroying themselves. The tendency is for them to increase and multiply in full proportion to the whites in the country. They are here to stay, and must ever be reckoned with in considering the labour problem.

Whether it is morally or sentimentally correct or not, when you put a superior race in contact with an inferior, and especially in numerical inferiority, the natural attitude to be expected is that the superior race takes the *rôle* of master, and relegates to the inferior that of man. After all, is not this founded on the fundamental law of self-preservation? How else is the white race to survive in such contact without extinction or deterioration? The non-perception of this principle is perfectly natural for the kindly disposed theorist, who has never lived under the conditions set forth, but its vitality is known to the old residents of South Africa, the Southern States of America, etc. Workmen direct from Europe may for a time seem exempt from this racial feeling, but the differences of race exist, and they cannot escape being inoculated with the virus, which in time must cause ulceration, and finally leave its scar. The wise statesman and employer of labour recognise facts, even if they dislike or disapprove of them, and deal with them as they exist, not as they would have desired them.

The wisdom of only using the whites for brain-power and the natives as the muscular machine, must be apparent as well as the danger of working them side by side as fellow-workmen.

The extent to which labour figures in the working expenses of the producing companies is shown, by the records of 1898, to be 28·39 per cent. for white and 29·05 per cent. for native labour, or, together, 57·44 per cent. of the total cost connected with the production of gold; the other main items being fuel, 8·23 per cent., and explosives, 10·95 per cent., with a remaining balance of only 23·38 per cent. for other costs.

The labour question is now the burning and absorbing one. In January, 1903, there were only some 2,905 stamps at work; in August, 1899, 5,970 stamps.

On the 1st January, 1903, some 10,000 whites were employed at the gold and coal mines with, say, an average wage of £26 10*s.* per month; and 48,000 natives, costing, with food, wages, etc., say, 2*s.* 4*d.* per diem. In August, 1899, there were employed some 12,000 whites and 97,000 natives.

The problem is how to get the necessary number of natives for present and future requirements. If all whites were employed, as living expenses and other conditions demand for them very high wages, it is estimated that some 10*s.* per ton would be added to working costs.

The cost of explosives has been reduced some thirty per cent. since 1898, and railway rates in the Transvaal Colony 20 per cent.

An accurate statement of working costs for all periods and for all mines since the start of the fields is not obtainable, but a rough approximation can be arrived at by deducting dividends from yields, though this is not a fair estimate, in that companies put back earnings into improvements. The following table shows the costs arrived at by this method for different years since 1890:—

	Shillings per ton.
1891	37
1892	35
1893	37
1894	35
1895	33
1896	32
1897	29
1898	28
1899	32

NOTE.—Between the years 1886 and 1891 the costs may be taken as from 70*s.* to 40*s.*

The comparison of actual working costs by the engineers for thirty-six companies shows:—

	s.	*d.*
1898	23	10
1901 and 1902	25	8·8
October, 1902	26	8

In 1901 and 1902 the Government tax on profits is not included; this would add, say, a further 1*s.* 6*d.* per ton to the costs of 1902.

Regarding the scale of working and the mechanical appliances employed, these fields are far away in advance of any others ever known in gold mining. We have seen that it has been estimated that some £30,000,000 has been expended in connection with the development and equipment of the mines in operation, and the engineers' statement shows that, if all conditions continue favourable, there may be a further expenditure of some £50,000,000 within the next ten or fifteen years.

The tendency is for companies to work on larger and larger scales; most new companies are being planned on a basis of a 200-stamp proposition, or even larger. The expenses of development and equipment of a mine on such a basis is given roughly from the accounts of one of the companies on the first row of deep-levels as:—

	£
Shaft sinking	87,000
Mine development, including inclines .	275,000
Machinery and plant	334,000
Buildings	66,000
Distributing reservoirs, etc.	7,000
Total for 200 stamps .	£769,000

Records of the stamp mill accomplishments show that on an average four tons are crushed per stamp.

Examination of the engine-rooms shows compound and triple-expansion mill engines, dynamos for generating electrical power for use on surface and underground, duplex, two-stage, air and compound steam compressors, and improved winding engines of great diversity of design. Statistics of the State Mining Department show that in 1898 there were some 1,850 air-drills in operation on the fields. The design of the mills, cyanide works, and slimes plants indicates the great efforts that have been made to minimise the use of muscle, and the balance-sheets of various companies show the heavy outlay thus incurred. Mechanically operated devices for transport are in great evidence, as seen by steam and electric locomotives, endless rope traction systems, belt conveyers, gravity haulage planes, etc.

It is not claimed that more cannot be done to extend mechanical devices for labour saving, but it is maintained that no goldfields in the world—or any mineral deposit with so small a tonnage per unit area of stripment and so many disturbances—exceeds or even equals it in this regard. The too great use of mechanical aids may prove very uneconomical. This is seen in the great use of compressed air-drills in the narrow beds, which is only justifiable on account of the scarcity of native hammermen.

No. 4.—*The time or rate at which the ore is, can be, or is estimated to be, extracted.*—The simplest way to show the power of this factor—and, in fact, to make clear the foregoing statements and discussion—is to illustrate its force by a definite example. Suppose we give to No. 1 factor certain fixed values, to Nos. 2 and 3 certain variations, and then unite them with No. 4.

With a caution that this is no attempt at a concrete estimation of the value of these fields, let us make factor No. 1 a deposit of 30,000,000 tons, 10,000,000 tons of which have an original assay value of 50*s.* per ton in gold, 10,000,000 tons a value of 40*s.* per ton, and 10,000,000 tons a value of 30*s.* per ton.

For factor No. 2 we will take extractions of 60, 75, and 90 per cent. at different periods.

For No. 3, working costs at different periods of 40*s.*, 30*s.*, and 20*s.* per ton.

From these data it is seen that, while the extraction remains at 60 per cent., the best that could be expected with working costs of 40*s.* per ton would be to work the best third of the deposit at a loss of 10*s.* per ton. These were the economic conditions of the fields up to, say, 1890.

With working costs of 30*s.* per ton, and an extraction of 60 per cent., the best third could be worked without either profit or loss.

With costs at 20*s.* per ton, and an extraction of 60 per cent., two-thirds of the deposit would show a profit of 7*s.* per ton.

With an extraction of 75 per cent., and expenses at 40*s.*, the result would be: the loss on the richest third of the deposit would be reduced to 2*s.* 6*d.* per ton. With 30*s.* per ton working costs, one-third of the deposit would show 7*s.* 6*d.* profit per ton, and with 20*s.* per ton working costs the whole 30,000,000 tons would yield 10*s.* per ton profit.

In the same way, take an extraction of 90 per cent., with working expenses of 40*s.*, 30*s.*, and 20*s.* per ton, and we obtain:—

1st case:	10,000,000 tons	at	5*s.* 0*d.*	profit.
2nd „	20,000,000	„	10*s.* 6*d.*	„
3rd „	30,000,000	„	16*s.* 0*d.*	„

This analysis clearly shows what important parts metallurgy and all factors of working costs play in giving ultimate value to an ore deposit.

No. 4 is the time element, and demonstrates the value of the magnitude and intensity of man's efforts. It would be wearisome and unnecessary to go through all the possible combinations of Nos. 1, 2, 3, and 4, but for purpose of illustration let us assume that we have finally combined Nos. 1, 2, and 3 to the best advantage, and it can be shown that 20,000,000 tons of ore are in sight, from which 20*s.* per ton profit can be obtained. Now what is the value of this proposition? And what could be paid for its purchase?

Say that 200,000 tons a year are crushed, then the operations would have to be continued for 100 years, and 100 annuities of £200,000 each would be received. The initial outlay for equipment and development to start the crushing would be, let us say, £500,000.

For mining ventures, annuities would not be discounted to present values at under 5 per cent. compound interest by cautious business men. Assuming this, and using compound interest tables that give present values of annuities, we obtain:

For working at the rate of 200,000 tons a year, allowing an outlay of £500,000 for equipment, a present value of about £3,500,000.

Say, again, that we crush 400,000 tons per annum, and had an initial outlay of £1,000,000, then the present value would come to about £6,300,000.

Again, if possible, say we crushed 800,000 tons per annum, and had an initial capital outlay of £2,000,000. Then about £9,300,000 is the present value.

From this it is seen that the present value of the deposit, even after allowing for the extra equipment involved for shorter periods, roughly stands as 35 to 63 to 93, or that to work it out in 25 years instead of 100 years, its commercial value is increased nearly 2¾ fold, the profit per ton remaining absolutely the same, and no credit given for equipments.

The above calculations are fascinating, but if pushed to extremes are very dangerous, and should only be seriously made after very careful study of the general promise, ore reserves, labour conditions, etc., of the district to which they are to be applied.

* * * *

It is hoped it has been indicated, and in a measure demonstrated, that the Witwatersrand goldfields are of great extent, and possess vast quantities of gold-bearing conglomerate, which, although their value is variable, over certain large areas have sufficient gold to warrant the assumption of profitable extraction. It must not be understood, however, that these fields stand prominently forward in their record as regards yield and profit per ton; in fact, very much the contrary is shown by some yields of other countries given in note below :—

	Per ton. s.	d.
NEW ZEALAND—		
Waihi Gold Mines	55	4
QUEENSLAND—		
Mount Morgan	109	10
Charters Towers Field	103	7
Gympie	102	9
Croydon	68	11
Ravenswood	60	10
Etheridge	75	3
WEST AUSTRALIA—		
Great Boulder	120	0
Lake View	120	0
Kalgoorli	140	0
TASMANIA—		
Tasmania Gold Mine	82	0
New Golden Gate	70	0
INDIA—		
Mysore	108	7
Champion	107	3
Ooregum	83	5
Nundydroog	97	5
CRIPPLE CREEK—		
Portland	200	6
NEVADA—		
Comstock	205	4
COLORADO—		
Camp Bird	127	9

	Per ton. s.	d.
VENEZUELA—		
El Callao	152	2
MEXICO—		
El Oro	55	9
CANADA—		
Le Roi	49	6

The average profit in the past, as measured by the dividends declared, is seen to have amounted to only 10*s*. 6*d*. per ton. This is a very drastic method of showing profits, but even if the yields and costs of most of the companies for 1898 and 1899 are analysed on the most favourable basis, a profit of only some 15*s*. or 16*s*. per ton can be shown. Some mines at the present time show very much higher profit—in fact, 50*s*. per ton, but the average will ever be kept moderate, even though working costs will quite certainly in course of time be materially lowered. This will be brought about by working more and more of the vast quantities of ore that exist, but do not warrant extraction under the present conditions. Thus the commercial value of the deposit is, to a great and very unusual extent, in man's hands. Nature has been prodigal in her areas of promise, munificent in her moderate certainties, but sparing in concentrated gold abundance.

A hundred years ago, with the then current metallurgical knowledge, machinery design, and limitations of intercommunication, these fields, if known, would have been comparatively worthless. Their future worth and magnitude still largely rest in man's hands.

There is left to man but a small margin to improve upon in the department of percentage of extraction. The crux of the present position is this: At what cost can the gold be extracted, and in what time?

As working costs are reduced, so will more and more of the conglomerate beds warrant exploitation. The quicker and greater the returns, the more justification is there for the capitalist to put up great sums of money for the development and exploitation of the fields.

In the sphere of working costs the dominant factor is labour. Probably this factor has never been found in a more intricate or complex setting. Some of the features that can be mentioned are:—

Sparseness of population, with a ratio of one white to five natives.

The characteristics of a native are that he is virile, docile, strong, and, if trained, equal to the European as a mere muscular machine. His wants are few; the law allows polygamy, and consequently women do most of the agricultural work. The married men are thus lazy, and have few incentives to work; sufficient natives are therefore difficult to obtain and to retain at the mines.

The white labour difficulties are that the present cost of living is most excessive, and this will require time to modify; therefore the wages required are justly high. Unskilled labour is unsatisfactory on account of the wages that have to be paid, and the demoralisation consequent on concurrent and similar work being done by Kaffirs.

In the domain of skilled work the mining industry's progressive requirements, which are out of all proportion to all other industries in the country, have prevented wholesome competition and the maximum efficiency, and there have been no labour reservoirs in the country to draw upon in case of emergency.

The wages paid are the highest in the world; it has been shown that, on an average, in 1898 some 10,000 workers at the mines averaged £353 per annum. As the proportion of unskilled white labour used becomes greater, so working expenses are largely increased, and the number of mines that can work at a profit is decreased.

If the white labour wages are lowered, the cost of living debars the coming or stay of the family man, who should be regarded as the fundamental factor in the future destiny of the country. And it is not only the numbers, but the quality of the family man, that will make for good and prosperity. If great numbers and low pay of whites should be insisted on, all European countries would probably be called upon to contribute, and the quality, politics, and morality of the unskilled workers would be, to say the least, uncertain.

There is no use in dwelling on the desirability of the country being wholly a white man's country, or that it should be so after the terrible baptism of blood that it has passed through, and after so much treasure has been spent by Great Britain in the war, and when the great number of unemployed there is remembered. Certainly this attitude of thought should be sympathetically regarded. But the great facts that stand out against it are:—

1st. There are 5,000,000 vigorous natives in South Africa who object to extermination, require Government protection and guidance, and therefore should be made to take their share in the work of the country.

2nd. The inbred instinct of the white race against working on an equal footing with the black.

3rd. That men cannot be forced to run industrial enterprises at a loss, and the higher the working costs, the smaller will be the tonnage exploited and the less the total gold won.

It seems to me that the greatest number and best quality of British colonists can be established in connection with the mines by working the greatest number of mines at a profit, employing the greatest number of skilled workmen, and giving them an opportunity of earning high wages.

The labour costs can be regulated by making the white men supply the brains and paying them well; but the greater portion of the muscle must be supplied by another race, one who will be satisfied not to enter the white domain, and will cheerfully work for wages far below that required by the white population.

The great question is the obtainment of the necessary coloured labour to meet the present demands and future expansion. The remedies seem to be:

To apply inducements and pressure to the natives in the already tested native labour fields of South Africa; the inducements being extended in form of money, comforts, and enjoyments, and the pressure applied by making them conform more closely to the ordinary demands of civilisation in fields of work, taxation, and restraint.

To extend the recruiting area with great vigour to all accessible parts of Africa; and, as a final and last resource, and under supervision from Government, to turn to Asia for help.

This labour question requires not only the attention of employers of labour, but also of the statesmen of South Africa; for not only is the expansion of the mining industry at stake, but on its right adjustment all industries of South Africa depend, and all political difficulties and racial differences are also involved.

The proper handling of the native question, now that the war is over, is the most vital and most difficult problem to be dealt with in South Africa.

It is seen that the character of the Witwatersrand fields is such that no fear need ever be entertained that they can in any way upset the standard value of gold; for it has been shown that in the past man has had to pay full measure to Nature in the true standard of all values, viz. labour (of both hands and brain), for the gold he has obtained.

As the fields succeed in favoured sections, so will less promising and more speculative areas be brought into activity, and blanks as well as prizes will be drawn.

Thus it will be found that, even in these, the greatest and most enduring goldfields the world has ever known, Nature demands full toll for the gold yielded up to man.

APPENDIX B

MINING REPORTS AND MINE SALTING

A PAPER READ BEFORE THE INSTITUTION OF MINING AND METALLURGY

BY WALTER McDERMOTT (MEMBER)

MINING REPORTS

SOME apology, or at least explanation, seems called for in the introduction of this paper; for while the subjects treated are of interest to all engaged in the mining business, they become more or less personal in character when written on, and tend to drift into the form of a lecture. Should these objections become too apparent to the members, they will perhaps exercise a proper toleration in view of the fact that we have with us not only Associates, whose age precludes any lengthy practical experience, but also students, who have still perhaps to go through somewhat the same experiences as are referred to in these notes. It has been my fate during the last twenty-three years, not only to write a fair number of reports myself, but also in the course of business to read a vast quantity of reports by other people; and it is much easier to find out the weak points of others to point a moral than to set a proper example oneself. The proper examination of and reporting on mines can never be covered by a set of rules; for in this work the personal equation plays an important part, and training, ability, and even experience, are all insufficient in many cases unless accompanied by the common sense and sound judgment necessary in all business transactions.

There is such a great variety of badness in mining reports that a little grouping of the cardinal sins will be useful. In speaking of mining reports generally, for the purpose of illustration, I intend to cover not only those made by mining engineers, but all those used in business, and so fairly subject to criticism, from that of the learned professor of other sciences, who is dragged from the seclusion of his study and put underground to be made miserable with candle grease, down to that of the practical miner, who, having beaten a drill for a certain number of years, is prepared to dogmatise also on facts, figures, theories, and conclusions.

Amongst the old friends we meet in numberless reports, and which seem to need a little protection against excessive wear and tear, the following will be considered:—

(1) The true fissure vein.
(2) Increasing width in depth.
(3) Increasing richness as depth is attained.
(4) Junction of veins.
(5) Ore in sight.
(6) Proximity to a rich mine.
(7) Failure from mismanagement.

Now, Heaven forbid that I should be held as speaking disrespectfully of any one of these things, each estimable in itself. My remarks are pointed only against their indiscriminate use, and particularly against their public use as catch-penny phrases in a way to imply more than they actually mean.

The True Fissure Vein.—There has been more joy over this one term than over anything else in the history of mining. The investing public has become intoxicated with the exuberance of its descriptiveness. The practical miner has grasped its effectiveness, and the first ring of his pick on an outcrop satisfies him he has got the genuine article with tap roots in the antipodes. What is a true fissure vein? It is supposed to be a fissure in the country rock filled with veinstone, which may be expected to go down to a considerable depth. The veinstone itself sometimes carries pay ore. This does not seem much to base any elaborate calculations on; and not only is it insufficient, but experience all over the world has shown that some of the most valuable ore-deposits are not found in fissure veins at all.

Even as far as mere depth is concerned, it is by no means yet established that true fissure veins go any deeper into the earth's crust than bedded deposits, contact or pipe veins; and it would be of no consequence if they did go deeper, since they cannot be followed. I have read a report of a geological expert who expressed himself as ready to stake his reputation that a certain vein would go down and carry its value to at least 1,000 feet. Properly used, the term "true fissure" is usefully descriptive, but where used as an incantation to call up visions of wealth to unlimited depth it needs suppressing.

Increasing Width in Depth.—It is naturally gratifying to the owner of a mine to see his vein increasing in width as he goes down on it. It also looks well as described in a report, and must naturally be mentioned when it occurs; but in some reports the implication arises that it is a vital point and to be calculated on as continuing. If a vein went on increasing in width it would very soon attain enormous dimensions; and if it outcropped in a country blessed with the law of the apex, its lucky owner would have a good claim to a very large proportion of the earth when he got down a few miles. It may pretty safely be assumed that the increase in width will not continue, and when it stops it is very likely to be succeeded by a corresponding decrease, so as to keep up the usual average of things. When, say, a fifty-feet shaft sunk on a vein shows an increase in thickness from one foot at surface to six feet at the bottom, there is nothing to show that in continuing to sink the vein may not gradually or rapidly pinch again to its size at surface, or even much less. If any calculations were justifiable at all in such a case, general experience would certainly lead one to expect such decrease. The only positive conclusion would be that the vein is irregular in width. It looks nicer and more definite in a report to say simply "the vein is steadily increasing in width as sunk on," than to state that "the width of vein is variable, running from one foot to six feet, and therefore until further opened in length and depth its average cannot be safely calculated on." The one statement is as true as the other, but the effect of the two in reading is not the same.

Increase in Richness.—There is a touching confidence in the belief of many practical miners that veins get richer as they go down. Experience and disappointment often fail to shake this comfortable belief. The remarks made as to irregularity in width apply equally to increase in richness with depth. Most practical men are able to cite a great many more examples of rich mines becoming poorer with depth than the reverse. I remember being struck with the inconsistency and persistency of the belief in depth in various camps of the Rocky Mountains. Up in the highest ranges, say 12,000 feet above sea-level, there are mines which need sinking on to prove their real value; and 7,000 feet below them in the foot-hills are mines equally needing depth. Probably the thought at the bottom of this belief rests, like some of the attractiveness of the true fissure veins, in the old idea of a central seething mass of precious metals, and in the forcing up of a molten vein-filling. This faith in the saving grace of depth and of true fissure veins in the face of facts, can be only explained by the definition of faith as given by the little girl—viz. "believing what you know is not true." The hankering for depth has its justification, of course, in the necessity for sinking usually to get any developments; but where access is obtainable to the foot of a mountain through which a vein runs, the same men who claim a special efficacy for depth in other cases will point to the vast advantages of having the ground above one to be opened by adits. The facts of experience show that when a vein is rich at the surface, a hope that it may continue is a more proper attitude than a belief that it will get richer in depth; and when it is poor on surface, any change in sinking would be for the better. Naturally these remarks do not apply to cases of known ore shoots of established directions.

Junction of Veins.—Striking cases of enrichment of veins at their junctions occur; but, as many examples of junction without richness also exist, it does not do to attach too much importance to the results to be expected. In some reports the future junction of two veins is often itself assumed on insufficient data, and the consequences are calculated on with a certainty which is still less to be justified. In this, as in other matters, Nature seems to have a rooted objection to fixed laws of clear and simple expression, and prefers them with so many "buts" and "ifs" that she is still practically free to do as she pleases.

Ore in Sight.—Under this head is included matter which is of the very greatest importance, and which requires the very best work of an engineer. The estimation of ore in sight in an opened mine often involves the consideration of so many points, and is so largely a matter of good judgment, that one may expect some discrepancy in the reports of different engineers. There is nothing in which such vast discrepancies do exist, in fact, as in regard to this. Two good engineers will vary in their estimate, and when it comes to inexperienced men, or to so-called practical men who have no reverence for the written word, the term "ore in sight" becomes a theme for the exercise of the highest flights of imagination and the airing of a little rudimentary mathematics. In the common mining report we are all acquainted with it is not unusual to see the length of the claim multiplied by a cheerfully assumed average width of vein, then by 500 or 1,000 feet for depth, and a tonnage deduced which reminds one of the figures used for astronomical purposes. Sometimes, to inspire extra confidence, the expert generously knocks off 25 or 50 per cent., and feels he has then done his duty, whatever happens. The character and ability of a man can sometimes be closely estimated from the way he figures up ore in sight after giving the dimension bearing on it, and it often suffices to look at this calculation in order to determine a report to be not only quite unreliable as to conclusion, but equally irresponsible as to data. It is evident from many reports that the authors have no sort of a clear idea of what a large hole in the ground is made by producing, say, 100,000 tons of ore. My friend Mr. R. T. Bayliss, of the Montana Mine, has lately given me some figures which illustrate very clearly the time and work and development necessary to extract the large quantities of ore which are often so glibly spoken of in reports as "ore in sight." The veins at the Montana Mine are large ones, averaging a stoping width of fully twelve feet, and the company has 110 stamps in operation; but it has taken eleven years to extract 702,000 tons of ore, and this only by development work in drifts, shafts, and winzes of over twelve miles in extent. There are some sanguine experts who would have seen this quantity of ore in sight in the early days of the mine, when a few short drifts and cross-cuts had exposed the great width of ore bodies in the upper levels.

In connexion with estimation of ore in sight, the system of sampling employed is worth mentioning here. In some reports the expert writes of taking samples "at random." When a man says he has picked some samples from a dump "at random," and they assay well, he implies that such ore is plentiful on the dump, and that he did not purposely select it from its appearance. What his statement actually means is, that on an important matter he was willing to trust to luck as to whether he hit poor or rich ore, or whether he was getting just what had been previously placed for him to get. Luck is a very necessary thing in mining, but it should not enter into sampling. If the sample is a random one its value proves nothing. Some people seem to think this method of sampling is important evidence of an impartial mind, and that shutting the eyes is the best security against the frailty of human nature, which would otherwise lead a poor creature to pick out the richest-looking ore he can find.

Another little weakness to be remarked in some reports is the willingness to make a liberal discount off the expert's own figures. The writer concludes, for instance, from his samples—perhaps taken at random—that a gold vein will average two ounces of gold to the ton, but, to be on the safe side, generously offers to take it at one ounce; and then with a light heart goes into calculations of profits by day, and month, and year. If a man knocks off 50 per cent. from his supposed reliable figures to be safe, it always occurs to me that the one who reads his report may feel tempted to lop off another equal percentage to be still safer.

I do not wish to be understood as condemning the very proper allowance which a careful man will make for the difference between results of milling large quantities of ore, and the assays of samples from the clean veinstone, owing to intrusions of waste rock and breaking down of country rock in mining when everything practically goes to the mill without sorting. The system here objected to is that of doing careless sampling and then making a heavy deduction to give the appearance of being on the safe side.

Unless a vein is very regular in value, the careless averaging of assays by mere numbers, without reference to the relative quantity of ore represented by each sample, leads to most misleading conclusions, and often gives away the writer of a report very badly.

Proximity to a Rich Mine.—There have been plenty of illustrations lately published in prospectuses of the great value the public places on a property which is near a well-known mine; yet everyone who knows anything of mining must be aware that mere proximity to a paying mine gives no assurance of similar success. The extraordinary continuity of the payable reefs at the Randt—an occurrence not applicable to quartz mining in any part of the world—seems to have caused a forgetfulness of the past costly experience in reckless mining investments by English companies. In Western Australia, although all evidence seems to point to some very valuable properties, it will be a truly extraordinary thing if there is not a great deal of disappointment resulting from the loose and unconfirmed reports lately published in some prospectuses, and which reports are illustrations of most of the defects mentioned in this paper. Some of these reports are absolutely nothing but a statement that the claim examined is on the same reef as, or near to, another property which is popularly supposed to be exceedingly valuable, and that rich ore has been found on the claim. Not a single attempt is made to describe the proportion of rich ore to poor rock; in fact, there is no mention of anything poor, so that the inexperienced are left to suppose that the full width of vein is rich ore. While a new mining country may always prove a surprise in some special departure from well-proved districts, rash prophecy is not the less to be discouraged.

The reports which get into local newspapers are always those of a sensational character; the facts which are needed for a cool estimate of actual developments are at first known only to the practical men on the ground.

In quartz mining it sometimes happens that a series of paying mines are found at intervals along a single vein. Occasionally the intervals between pay shoots are long, so that a good mine may be immediately surrounded by poor ones. In other districts one single good mine on a vein is all that is ever developed. The only actual advantage of the proximity of a good mine is the evidence it affords of there being payable ore in the district, or on a certain reef. Like other indications, it is of service only when used with discretion, but as an unqualified argument of the value of a neighbouring claim it is most dangerous.

Failure from Mismanagement.—That bad management may spoil a good mine is so self-evident a proposition that no one will misunderstand a few remarks against the improper or thoughtless use of this excuse in a report as an explanation of previous failure in a poor mine. A well-known Californian mining man, when asked to take charge of a mine which had failed to pay—as it was explained—from mismanagement, answered that he did not want anything to do with a mine which would not stand bad management. This is a remark which contains much matter for reflection, and embodies the opinion of most practical men. In reports the statement is sometimes loosely made that milling results in the past cannot be relied on, owing to primitive machinery or processes hitherto employed. This argument has often been advanced on Mexican mines by experts who have not had time to find out that native methods of working often give better results than the rapid working by the most modern machinery. With free gold ore it often happens that very simple and crude machinery will give quite fair results; an arrastra, for instance, will beat a stamp mill. In calculating on such past work by the owners of a property, it must not be overlooked that, even if they did fail somewhat in theoretical extraction, they probably selected better than the average grade of ore to begin with. Therefore when average assays indicate higher milling value in a report than past returns, it is natural to look with suspicion on the sampling, unless some good explanation, better than the supposed blundering of former management, is given. Such explanation is of course simple enough when the process previously used is evidently not adapted to the ore; but it must be shown, not assumed because the machinery seemed to be crude.

The difference between the method of an experienced responsible engineer and that of the inexperienced or reckless expert is that the former takes as little for granted as possible, and will not prophesy unless he knows, while the latter gives the reins to his imagination. We all remember the luxuriant crop of reports in the early days of South African gold mining, written by authorities whose previous mining experience had been confined to the costeaning of a potato patch, or to exploratory operations on their neighbours' bank accounts. Some of these sanguine gentlemen, who took every surface showing of gold as sure evidence of vast wealth below, scored some brilliant successes on the Randt, although their ounces became pennyweights in working; but when they extended their system to the regular run of gold veins in other parts of the country they met the usual slap in the face which Nature keeps for rash prophets. The careful man is of necessity at times discredited in the opinion of those who misunderstand his responsibilities, by reason of his refusal to become excited by a good surface show, which his experience tells him is no safe guide as to depth; while the reckless and inexperienced will freely call on their imaginations. There are cases of this description in which, however rich a mine may afterwards prove, it is more creditable to have been cautious than to have been sanguine in the early stages. If it would not be held as rather unduly exalting the profession, I should quote in this connexion, "Fools rush in where angels fear to tread."

After all these remarks as to what mining reports ought not to be, it is perhaps permissible to say a few words on what they ought to be, but with the apology to our experienced members already referred to in introducing this paper.

A report need not be long-winded to justify the fee paid for it, but should be so full in actual description as to enable a reader experienced in mining to draw his own conclusions from the facts given, without having to trust entirely to the deductions of the writer. Where a fee is paid for a simple expression of opinion or specific advice there is no need of a report, in the sense of the word as we are now considering it. The important details to be set forth clearly are those relating to position, and facility of access to the property; local conditions as to fuel and water, and timber-supply; extent and form of openings; variations in thickness of deposit; character and value, and form of occurrence of ore. It is important in giving a clear idea of the property that the distribution of the payable ore in the deposit should be described. It makes a great difference sometimes in the conclusions to be drawn, whether the value consists in rich ore occurring in a barren vein mass, or in high-grade ore scattered through a low-grade deposit, or in a uniform value throughout the rock. On account of the necessity for this description it is not always sufficient to state than an average width of vein contains an average of so much value per ton, as this may be in the nature of a conclusion, not of a fact, and so may need to be justified by detailed facts of the report. The extent and character of dump piles at a worked mine often afford valuable confirmatory evidence as to the character and value of the property. I have seen reports in which piles of rich ore were stated to be on hand at the mine in certain quantity and value; but on figuring out the expert's own statements as to width of pay ore and extent of openings, it was clear the hole in the ground could never hold the ore said to have come out of it. The configuration of stopes in a worked mine often gives very suggestive ideas as to the run of pay ore, and as to the probable character of ground still standing.

Geology and mineralogy should naturally be used with discretion, but only for purposes actually bearing on the description and conclusions to be drawn, not for mere padding, nor for the airing of theories better treated in a purely scientific paper. I have seen a report which started with the nebular hypothesis, and traced the progress of the earth from its pulpy state right down through its various stages to oxidation of the outcrop of a particular vein in the year of grace in which the report was written. These details were so full that there was no room left for anything but a very brief treatment of the merely commercial question of the value of the mine.

Examinations naturally differ greatly in the nature of the calls they make on the expert. In a district with which he is well acquainted there are often certain simple facts which enable him rapidly and safely to arrive at his conclusions; in other cases it is often a matter of hard and conscientious work, however clever or experienced the engineer may be, and any scamping of this work will imply unreliableness.

Finally, an experienced man in making a report will have an open mind for possible new forms of ore occurrence, while refraining from prophecy about things not in sight. Events may work against the most careful and experienced man by unforeseen increases or decreases in value on opening new ground; but as mine examination is an art and not an exact science, it is by average results that an engineer must be judged. A mining engineer has only ordinary eyes, and so, as Sam Weller says, his "wision is limited"; if he had "a pair o' patent double-million magnifying gas microscopes of hextra power" he might look into the earth a little further.

Mine Salting

There are all degrees of "fixing a mine": from the legitimate showing of its best features by not taking out all the rich ore before offering for sale, on by varying degrees of rascality up to palpable salting of mine, dumps, and expert's samples. In the less illegitimate stages much can be done, and very frequently is done, in the way of a judicious stopping of faces in good ore, and by the observing of a discreet silence as to past weaknesses and irregularities of the ore-deposits. In such cases it is simply the ordinary commercial position of "let the buyer beware," and the expert has to show by his report if he has experience, observation, and sense enough to form a sound judgment as to value.

In a mine which is thus carefully prepared for selling, it is not at all uncommon for the owner to go beyond the legitimate limit already indicated, and to misrepresent facts by filling up or concealing old workings which would, if examined, produce an unfavourable impression. The next step in the downward path which leads to a hotter place (but in the meantime also sometimes to affluence) is the scooping out of the inside of apparently solid blocks of good ground by openings afterwards filled up or timbered over. Some of the most experienced mining men and engineers have fallen victims to this and the previously described course of conduct; while some have just escaped being caught by a mere accidental indication of the fraud, or by the "peaching" of some miner who helped in the work and had not been "squared." Naturally the danger from the sources mentioned is much less in new mines of limited extent than in old mines extensively developed. In a mine which has been worked for some time the visiting engineer is at a great disadvantage as compared with the men who have worked in it for years, and perhaps devoted their greatest skill to making not only a good record, but to concealing the exhaustion which is approaching. It happens occasionally also that the owners complete their work, by "picking the eyes out of the mine," in the interval between the expert's report and the turning over of the property to the purchasers. The richer the nature of the pay ore in the mine, the greater the danger from this piece of rascality, which needs specially providing against in the terms of purchase, and by other precautions.

The above-mentioned very real and not uncommon dangers, against which the engineer has to guard, are not, however, "salting" in its proper and technical sense, which is generally understood as covering any interference with the expert's chance of arriving at a true estimate of the value of ore. The salting may be done on the ore before the expert's arrival, or during his sampling, or on his samples when taken, or while panning or assaying.

Although cases are well known of faces in a mine being salted with such success as to catch the unwary, this form of salting is usually too difficult to carry out, and too superficial in character to offer much chance of catching an old bird. With ore dumps and alluvial deposits it can be done with better chances of success, but is naturally of an expensive nature if carried out on a really systematic plan. Cases are on record of successful salting of alluvial ground with precious stones as well as with gold, and the expert must clearly be on the watch against this, when circumstances allow of the possibility of its occurrence. With ore dumps it is often very easy to arrange a veneering of good ore over a very large pile of poor or barren rock, and then when the ingenuous gentleman who takes samples "at random" comes along he will be sure to obtain a gratifying result.

A good many years ago I made the personal acquaintance of a prepared property on Lake Superior. It was a home-made tin mine. There had been rumours of valuable discoveries of tin ore on the north shore, where I was then living; and late one autumn an expedition from the United States went to report on it, taking an experienced Cornish mining captain for the necessary technical knowledge. A very glowing report was issued, and a company formed; rich samples were exhibited, and some tin run out of them and melted into spoons, which were presented to the fortunate shareholders. At that time the north shore was inaccessible for six months, except by a 200 miles' tramp on snow-shoes to where I was, or 350 miles to the tin property, so the excitement grew during the winter from the enchantment which distance lends. The report and the news of the excitement reached us in course of mail, and I was sent with an expedition, and a land surveyor, to report on the properties and take up land adjoining before navigation opened, and before anyone else could reach the spot, which needed only 150 miles of snow-shoeing for us. A good deal of ingenuity and work had been expended in making a tin vein, and a township had been surveyed in anticipation of the future rush for land. Some natural cracks in the country-rock (true fissure veins which Nature had overlooked when the mineral solutions were ladled out) had been filled up with a mixture of broken tin ore from Cornwall, copper tailings from Lake Superior, and soluble silicates for cementing material. In the camp of the promoters we found a barrel of the soluble silicates used. In the meantime the idea of the value of the discovery had grown so much that it seemed necessary to sell the property in London; the United States could not hold it, and a financier—who was really a believer—was sent across the water. Curiously enough he applied to people for whom I had previously made reports, and on my return to headquarters, with the principal vein in my possession, I found a cable asking me to report how many millions it was worth, which I was able quickly and accurately to determine. Some years later in Colorado I was introduced to the gentleman who planted the deposit with the explanation that I was the individual who had taken away his best lode in a small boat. The circumstantial report by the Cornish mining captain I have since heard explained by the fact that he was not accustomed to the particular brand of champagne used on the expedition.

My first report on a silver property in the same country was not calculated to breed confidence in mining methods. I had left England with a full report by a Government surveyor of the mine and its riches, but the claim was covered by the virgin forest: not a sign of outcrop or working; nothing to sample. There was nothing to report on but a magnificent crop of black flies and mosquitoes. The sanguine Government surveyor had evolved his description out of his inner consciousness, and aided by a ten-foot shaft on a small vein on an adjoining property. Since that time I have never felt a blind confidence in Government surveyors as mining experts.

The salting of samples is, however, much more common than any other form of getting ahead of the expert. It is less expensive than salting in advance, more deadly, and can be nicely adjusted to circumstances and to the individual weakness of the victim. When the owner of the mine, or anyone connected with him, is allowed to assist in the sampling itself, there is no lack of opportunity with some ores for the artistic salting while in the mine; but as a rule engineers do not have the requisite faith in human nature to accept such assistance, unless the character of the ore and kind of samples required make salting impossible at the time. In a strange district, where assistance of some sort has to be obtained in breaking and transporting large samples, and the character of such assistance is not absolutely certain, the engineer must guard himself by duplicating entirely alone certain test samples. Assuming that samples have been secured without any chance of outside interference, the business is by no means ended, for the enterprising salter will follow those samples until actually panned or assayed, or taken out of his reach. I propose to illustrate some of these special dangers by the aid of a few personal experiences which will show that neither keeping samples locked up or sealed, nor delivered to post office or express company, will insure absolute protection in all circumstances. In fact, to paraphrase a patriotic maxim, it may be said that "eternal vigilance is the price of freedom from salting."

To the successful cultivation of the art of salting no great knowledge or experience of mining is necessary, any more than a study of architecture is essential to the practice of burglary. True ability will assert itself in this as in other employments by the invention of new means to meet special cases, and by proper discretion in regulating the dose of salt administered to the temperament of the patient. Sometimes the honest miner will freely relate stories of methods by which experts had been salted, implying delicately that no such schemes would be successful with his hearer, but reserving one, undescribed, for purposes of personal illustration later. As an example of the unexpected which may occur after samples have been safely removed from the mine, I may refer to a case in the Rocky

Mountains, where I had taken some samples to the nearest town and made arrangements with the local assayer for the use of his office. I preferred to make my own assays, not from any chance of his knowing where the samples were from, but rather from a distrust of his somewhat rule-of-thumb methods. I allowed this brother professional to continue his work while I did mine; and, although apparently quite satisfied that I should pay him for the assays and do the work myself, his feelings must have been injured, for he doctored my samples without any other possible motive.

This inhospitable action caused me some annoyance and extra travel, but otherwise fortunately had no serious results beyond somewhat lessening in me the proper Christian belief in one's fellows.

It is remarkable how generally the elementary knowledge of salting is distributed over the earth. Wherever mining is, there the salter is likely to be developed, regardless of differences in climate, language, or religion. The art is not unknown in England. Not long ago I was asked to look at a gold placer in Wales, and though I should not have picked the country myself for exploring purposes, the terms offered left all the risk on the other side—so I went. The owner took me over the ground, and I industriously panned in all the likely spots pointed out with never a colour to cheer my heart. The owner delicately intimated that perhaps I was not much of a hand at panning, and further, that my gold pan was a poor contrivance. He thereupon sent up into the mountains for a certain Welsh mining captain, who duly came down with a Mexican wooden batea, and promptly produced good prospects from various places. He was so very skilful, that when I gave him a sample of my own tailings from tests before he arrived, without mentioning their source, he got a fine healthy show of gold even from them. When I mentioned that he had been working on what I washed off without getting a colour, the Welshman was so confident of the fault being on my side, that I took half of the next sample he was about to wash and showed in my pan a better prospect than he did with his half.

I wish now to introduce another personal experience for the sake of the morals contained in it, and as bringing out some of the special risks to be guarded against in mine examination. The story is at my own expense, and may therefore be somewhat unusual in the *Transactions* of a scientific institution. I am not afraid of the example being followed to the injury of the reputation for shrewdness of mining engineers generally. It is not pleasant to write oneself down an ass in any form; and personal experiences, which, if related, might lead to such conclusions, are usually kept as private as circumstances will permit. Some experiences which might be very instructive if published, but which naturally do not get known, are those arising from salting when the expert never knows himself of its occurrence.

A few years ago an English mining engineer and friend of mine brought to me in New York—where I then had a testing mill and assay office—a series of average samples he had taken from a silver mine in the Rocky Mountains and also half a ton of the average ore for a milling test. The samples came out very well, the milling test showed no difficulty in treatment, and the engineer's report to his English principals was quite a glowing one. For financial reasons the purchase fell through in London, and a year later the owner of the mine called to see me about the property. I had been so well impressed with my friend's report on the mine, and the owner's description, that I made offers to purchase on behalf of an English company, subject to examination. Before going so far, however, I got a report from a mining engineer resident in the West, and whose name is well known, confirming the owner's statement as to quantity and average grade of ore in sight. In addition to this, I had copies of statements by two other Western engineers, showing the mine to be valuable if the ore were worked by milling process instead of by shipment to smelters, as had been done in the past. On this I visited the mine and sampled it carefully, taking some 1,200 pounds of samples, and sealing the sacks in the mine by wire through and round the necks, and held by a special lead seal of my own. I wanted large samples to confirm previous milling tests, as the matter of treatment seemed an important one; but as I could not carry about me, and sleep with, 1,200 pounds of ore, and no vigilance would prevent the possibility of value being worked into the sacks if once lost sight of, I took a special precaution against salting in the following manner. The ore occurred as a bedded deposit, and, outside of occasional pockets of good ore, was reported to be of an average assay value from thirty to fifty ounces of silver per ton by the different engineers who had examined it. It was a question of milling the full width of the bed, which averaged about six feet; and the appearance of the ore lent itself wonderfully well to the theory of its average value. I therefore took, in addition to twenty-six average samples, seven special full-sack samples from different parts of the mine, each of which consisted only of large lumps of the poorer ore, without any fine admixture. The object was to have samples which could be readily cleaned when once in my own office, and therefore which would be unaffected by any salt introduced, in a fine or liquid state, into the sacks after sealing. With certainty that there had been no salting, if these lump samples showed a fair silver contents, there could be no doubt whatever as to the value of the deposit.

In this material world good intentions are by themselves very inadequate. My little programme, framed for my own protection, was in an evil moment slightly changed, and thereby ruined. Owing to pressure of inquiry for a preliminary report I decided to crush five of my seven test samples in a neighbouring sampling works, and so satisfy myself as to the lower grade of ore which would determine the probable value of the mine for me. I took every precaution by cleaning up the crusher and rolls myself, and dusting off the lump samples, and crushing and quartering down to the assay samples, which I took in duplicate. One of the sets of samples I gave a local assayer, who was, I knew, interested, and would not have been, of course, reliable if unchecked. The second set of samples I kept myself in a valise in my bedroom. Subsequent events showed that these private check samples were got at, and that the whole mining camp was honeycombed with a six years' standing conspiracy. I had still in reserve the two other lump samples sealed as taken, and which, with the other twenty-six average samples, were sent on to New York to await my return. As bad luck would have it, however, I was stopped by telegram on my return, and had to go further west to examine another mine; and the samples arriving before I did, were crushed and assayed by my assistant in New York without the special precaution necessary for the two lump samples of cleaning before crushing.

During the night preceding the shipping of the samples the gang interested worked into each sack a dose of extremely finely divided precipitated silver, which can be purchased in the West from leaching works using copperplate precipitation. In the final crushing and mixing for assay samples the "salt" became properly incorporated, and appeared duly in the results. Investigation later showed that the lump samples alone contained naturally about two to three ounces of silver per ton, but when properly doctored they went from twenty to thirty ounces. As I cleaned and crushed my first five lump samples no silver previously worked into the sack could have materially increased the assay of the big pieces, but when once crushed the salting could be easily effected, and, as before mentioned, my small crushed samples were got at afterwards independently. The two lump samples were doubtless given an extra dose before shipment to allow for loss, and my assistant in crushing them doubtless emptied the whole sacks into the crusher, perhaps even shaking them afterwards. There is not the least possible doubt as to the method of salting, because I found afterwards in every sample, by panning and the use of a microscope, that the value lay in the fine metallic silver which did not exist in the mine itself at all.

The presence of the metallic silver in the samples was discovered by me in the course of milling tests, and its peculiar character so far raised suspicions as to lead me to endeavour to get a new sampling; but I was defeated by a concatenation of circumstances too involved for explanation here, and chiefly due to the skilful manipulation of the gang, who, with every appearance of willingness to help in any way, managed to block every step. In this course they were assisted by my principals, who pushed on for completion of purchase, and would not hear of any chance of error in view of previous reports by other engineers, and of the necessity of making payments at a fixed date. Nevertheless, within a few days of the completion of the purchase I sampled the mine again; the first assays settled the matter, and I cabled the fact of the whole business being a swindle to the purchasers, and started on the uphill work of bringing the matter home to the gang. Now salting is not a thing which a man does by the roadside while his neighbours are going to church; and unless one of the conspirators should "peach," it is always very difficult to make an absolute case for trial. Owing, however, to the form of "salt" introduced into my sacks, which I was able to separate and exhibit by microscope slides, and to a vast amount of circumstantial and detective evidence collected little by little, I was able, after four years of working and fighting, to get a sweeping judgment against the vendors of the mine.

From facts and evidence in this case I am able to throw some light, not only on my own shortcomings, but on the misfortunes of three other engineers in respect to this same property, all useful here for the purpose of showing variations in the art of salting. The English engineer had not even sealed his samples, but had tied his sacks with string, and had crushed and sampled the ore in a local mill before shipping to me. Before this, however, the gang had been able to calmly empty out his average samples and fill his sacks with the best selected ore of the mine, so that no introduction of foreign matter was necessary. In my milling tests on his samples I had made no microscopic examination as I did later on my own sampling; and when I found the metallic silver (which I supposed to be native silver, but was still suspicious of) I at once looked for the previous assay samples of a year before. Had I been able then to find these the game would have been up; but here, as at one or two other turning-points in the case, it is clear that the devil had a retaining fee from the other side, and was earning it. We usually kept small assay samples of all tests for a year, and then threw them away, and the last cleaning out had been down to and inclusive of the identical samples I wanted. Curiously enough, some months afterwards a single sealed bottle of the mixed average of all the samples of the English engineer was found, and made useful evidence in the case, for it contained none of the metallic silver which constituted the value of my samples.

An American mining man who took small samples and sealed them with the end of his penknife, as a distinguishing mark, took the samples himself to the Express Company's office at the nearest railway station, but the agent of the Express Company had been persuaded to let the owners of the mine take a look at these sacks of ore in his charge. They opened the sacks, changed the ore, and resealed the packages, using a penknife as the expert had done.

The experienced Western engineer—whose report had been received by me before I first went to the mine—had taken his samples carefully, quartered them down in the mine to small samples, put them in sacks, and sealed them with his own seal, having his initial on it. He also delivered his samples personally to the Express Company, and felt safe in consequence. At midnight two of the salting gang and the Express Company's agent were at work on these sacks. To avoid breaking the seals, which they could not duplicate, they opened the sacks at the bottom, at the join, and neatly sewed them up again after substituting a more satisfactory grade of ore than mere average samples of the mine were likely to prove. A sack which has the sewing of the join inside, and is sealed at the mouth, cannot be opened at the bottom and re-sewed with absolute impunity; but the opening need not be large, and with neat work, and the big chances of the expert's having absolute confidence in the Express Company or post office after he has personally delivered his samples, the business can be done. It certainly succeeded in this instance up to the salter's full expectations. The enterprising gentleman who was directing operations, evidently thought, however, that cutting seams of sacks and re-sewing was more fatiguing and not so artistic as duplicating seals, because he had the foresight to take a copy of the impression of the seal on the sacks, and get one made for himself. The expert's initial was not his, but he explained to his friends that it might come in useful some day.

Besides these three experts and myself, there had previously been a professor of geology who had made a good report, on which a company had been formed, the mine purchased, and some working capital raised. It took this company some time to find out what sort of a property had been secured, because the head of the gang had bargained to be retained as manager. He judiciously steered the business into debt after getting all the cash forthcoming for working, then sold the whole property out for a song to one of his confederates, and started out on the search for fresh "suckers." I don't know how the professor was had, but probably he was occupied in the more important geological questions in connexion with the deposit, and asked the vendors to get him some good fair average samples by which to determine the value.

The microscope or a very strong glass is often of great service, as shown in the foregoing case. In silver ores the silver-bearing minerals can often be washed out and identified; and with gold ores the colour and form of the metallic particles are sometimes suggestive. Once in Dakota I was taken to see a vein said to be rich in silver, but the appearance of the vein-matter raised an immediate doubt as to what form the silver could be concealed in. By panning I obtained some native silver; but when examined under a glass some of the pieces showed traces of native copper attached. The only place I know where native silver and copper occur actually welded together is the copper region of Lake Superior; and on questioning a little the honest miner who was my guide—and who had kindly assisted in crushing some samples—I found he had formerly worked on Lake Superior. No great intellectual effort was then necessary to account for the occurrence of the silver in the very unpromising-looking vein-matter.

In the case of panning tests on gold ore, or gravel, or for precious stones, it is of course comparatively easy for anyone who is allowed to be within a short distance of the expert to get in his salting work, and solitude is the only protection. Among the known methods worth a passing mention are the following: the salter may use a quill toothpick as a weapon for long-range shooting, or have gold dust in his nails for short range; or charge his pipe or cigar, and not watch where his ashes fall. Cases have been known of gold pans prepared in advance by a valuable varnish which gradually rubbed off in use. Probably some of our members can describe other varieties of means for reaching the same end; and although it is not possible to mention all the devices, there may be some utility in putting on record for others the better known ones; for it is certain that many young engineers start out with the confidence of much learning, ready to undertake responsible examinations, and without any clear idea of the dangers they are courting. A man may acquire a fair amount of practical experience, and confidence begotten of the same, without happening to get into surroundings of any real danger, and so when least expecting it may yet be nipped. All men of experience agree that the only absolute protection is solitude; and that trusting to knowledge of the old tricks or to personal watchfulness is quite insufficient if any person is immediately around.

APPENDIX C

ORE IN SIGHT

A PAPER READ BEFORE THE INSTITUTION OF MINING AND METALLURGY

By J. D. KENDALL (Member)

THE estimation of ore in sight is very far from being one of the most difficult matters with which an engineer has to deal. Yet some of the most serious losses in mining have been incurred through errors in such estimates, and engineers have, very properly, been most severely censured for their failures in this connection. It is therefore proposed to bring the matter before the Institution with a view of making some recommendations which, if followed, will in the future greatly reduce, if they do not prevent altogether, the losses which have so frequently arisen in the past from so-called estimates of ore in sight.

Definition of Terms.—"Ore in sight" is an expression of very common occurrence in reports on mines. The meaning attached to the phrase does not appear, however, to be always the same. In some instances the so-called "ore in sight" is only "ore in imagination." The former expression, it is true, is not a happy one, for the ungotten ore of a mine can never be all in sight even when "blocked out" in the most complete manner possible in the regular working of mines. No matter how small the pillars or masses of ore blocked out may be, there must always be a large proportion in the interior of them which cannot be seen. But if a person of experience can see the four sides of a rectangular mass of ore in a vein, for example, he can, in the great majority of cases, form an estimate —not absolutely accurate, it is true, but sufficiently so for commercial purposes—of the quantity of ore contained in that pillar. He may in some cases be able to do so if he can only examine three sides of the ore-mass, or, again, even when only two opposite sides are in view; but in each of these cases he will have to employ a different factor of safety. This factor will also vary with the size of the mass under consideration. These remarks may be extended to ore-bodies of other shapes. On the other hand, if only one side of a mass of ore can be seen, it must be perfectly clear that no one can tell what quantity of ore is in that mass. The side visible may show a large area of ore, but quantity of ore involves a third dimension. If this be wanting, we cannot possibly know anything about quantity. The third dimension, so often unfortunately assumed, can only be ascertained, with an approach to accuracy, by "blocking-out," so that "ore in sight" may be looked upon as synonymous with "ore blocked out."

By "blocking-out" is meant the exposure of ore on two, three, or four sides of a rectangular or other shaped mass, as is partly illustrated below.

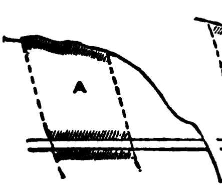


Fig. 1.

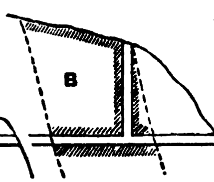


Fig. 2.

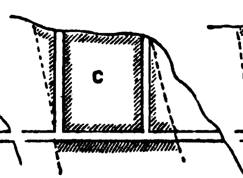


Fig. 3.

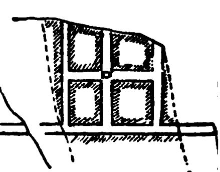


Fig. 4.

These four drawings represent, in vertical section along an ordinary vein, the same mass of ore—A, B, C, and D—on which different amounts of work have been done. It must be quite clear to anyone who has had experience of ore-deposits that it is a much more difficult matter to say what quantity of ore is in block A than in block B. It is likewise more difficult to estimate the quantity in B than in C; and if the block be still further opened up by workings, as in Fig. 4, the problem becomes easier still. Allowances, to cover any possible error from nips, intrusions, or inclusions, would have to be greater in the case of A than in that of B, and greater for B than for C. The allowances must, in fact, be inversely proportional to the amount of blocking-out. They must also vary as the distances apart of the exposed sides vary. For example, in the case of Fig. 1, if the tunnel were 200 feet below the surface at block A, the estimation of the probable amount of ore in that block would be much more difficult than if the depth were only 50 feet, and therefore greater allowances for possible variations must be made. The same remarks apply to the other figures. The extent of allowance—that is, the factor of safety—depends largely upon the character of the deposit, and must be determined on the spot for each particular case.

Blocking-out does not mean simply the exposure of ore by trenches, tunnels, drifts, winzes, and raises, but includes also the exposures that sometimes result from denudation.

Why Blocking-out is necessary.—Owing to the very irregular manner in which ore-deposits usually occur, no one can, as a rule, form even an approximate idea of their extent until the boundaries have been determined by actual work. But even if the main or outside boundaries of a deposit be known, there is still much to be learned with regard to the inside boundaries, for most, if not all, deposits contain more or fewer and larger or smaller inclusions of country rock or other barren ground, about which we cannot know anything until the deposit has been more or less blocked out.

Variations also occur in the quality of ore in different parts of a deposit, so that the more we see of it and the more samples we can take, the more likely are we to arrive at the average quality of the workable portion of it.

The man who has not, from experience, realised the truth of the above statements will be apt to permit his fancy to form his facts, and so reach conclusions which will most probably be altogether unreliable; for he will assume extensions which may not exist, continuity where there may (and probably will) be great interruption, and uniformity where there is great variation.

A few of many instances that have come within the writer's experience will now be given of the unreliability of estimates of ore in sight which are made when the ground under consideration has been insufficiently blocked out.

Illustrations of Erroneous Methods.—The first illustration relates to a deposit of argentiferous galena, which occurred as a vein. The diagram (Fig. 5) gives a section along the vein, and shows the amount of work done at the time the engineer of an intending purchaser made an estimate of the ore in sight.

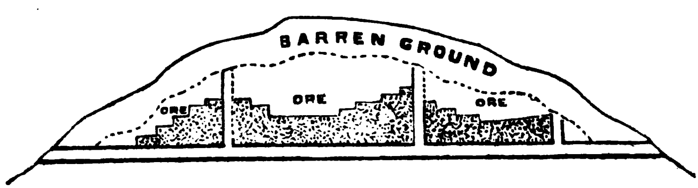


FIG. 5.

Had the vein carried ore at the surface, it would have been fairly safe to infer that the ore in the back of the stopes would extend to the surface; but, without satisfying himself of the existence of ore in the vein at the surface, the engineer referred to assumed that the body of ore he had seen in the stopes would extend out to "day." Had he taken the trouble, as he ought to have done, to ascertain what really was on the surface, his estimate would have been very different from what it was, if indeed he had thought it possible to make one. The writer followed soon after with the same object, but failing to find any ore at the surface—that is, lacking the third dimension—did not make an estimate, because the ore above the stopes could not be said to be in sight.

When the stopes were extended upwards, it was found that the ore actually nipped out along the dotted line in the diagram.

Another instance is in connection with a deposit of hæmatite. The deposit had been discovered by means of boring. Hæmatite had been found in five holes at the points shown in the following diagram (Fig. 6):—

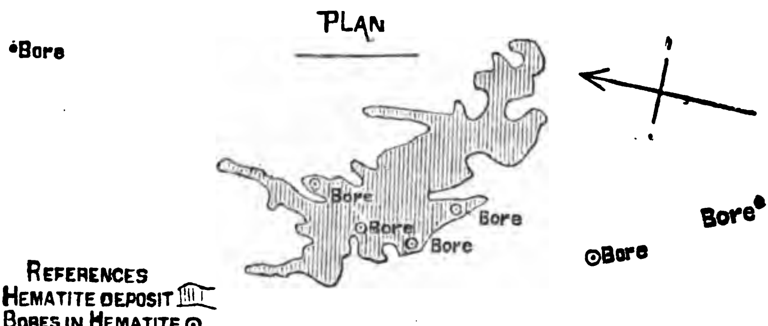


Fig. 6.

It was assumed that all the bores which passed through ore were in one and the same deposit, that the deposit extended laterally much beyond the bores, and that therefore a body of ore containing at least 650,000 tons had been "thoroughly proved"—to adopt an expression made use of in the report prepared for the sale of the property—which expression may be considered as another way of writing "ore in sight." This estimate led to a very serious lawsuit, for when the deposit was practically exhausted only 41,879 tons of ore had been raised, the lateral extent of the deposit being shown in the above diagram. To assume that all the bores which cut hæmatite were in one deposit was to disregard entirely all experience of such deposits. But, further, the founding of conclusions so important, financially, on such insufficient data is most reprehensible. If the ore had been more thoroughly bored, or blocked out by workings, before any estimate had been attempted, no such ruinous mistake could have been made.

Let us now consider an estimate of ore in sight relating to some gold-bearing veins. In its disregard of facts and its confident reliance upon assumption this is, perhaps, the most reprehensible instance that has ever come under the writer's notice. One vein could only be seen for a length of about fifty feet in a trench about four feet deep. The width of the vein in the trench was about eighteen inches. On these data it was assumed—for prospectus purposes, it ought to be said—that the vein contained 1,000,000 tons of ore. There were three other veins in the property which—also for prospectus purposes—were assumed to contain over 4,000,000 tons of ore, although there was not sufficient work done on them to thoroughly prove the existence of 4,000 tons. In this case we have not simply the assumption of the third dimension; the whole three are assumed. Can we wonder that severe things are sometimes said of those who make such an unscientific use of the imagination? Whether it be from incompetence or dishonesty is immaterial; the final out-come is alike disastrous commercially. That any competent person could ever make such an estimate is incredible, and that anyone should issue such an estimate to the public, after its utter unreliability had been pointed out fully, is, to say the least, most discreditable.

Another instance may be given to show the risks that are sometimes run in estimating quantities on a minimum of information. The vertical projection below was submitted to the writer by the owner of the property to which it related, with a view to sale.

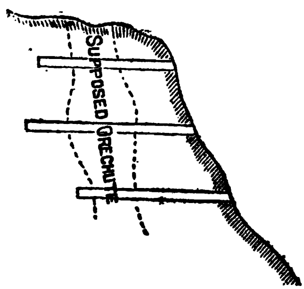


FIG. 7.

An ore-chute was represented as existing in the form indicated in Fig. 7, and a quantity was given, corresponding thereto, as ore in sight. When the writer examined the mine he found that no such chute existed. The country rock was limestone, in beds two to four feet thick, standing nearly on end. The overlying rock was igneous. The ore, a highly argentiferous galena, occurred interruptedly along the bed-planes of the limestone, as shown below (Fig. 8) in plan on an enlarged scale.

The different lots of ore seen in the uppermost tunnel were not on the same bed-planes as those in the level below, which, again, differed from those seen in the bottom tunnel. Moreover, ore occurred outside the supposed ore-chute altogether. As a matter of fact, there was not a scrap of evidence to show that such an ore-chute, as was assumed, existed. Not one of the lenses of ore extended from one level to the other. Had the ground been further blocked out by a number of raises the invalidity of the inferences drawn with regard to the supposed ore-chute would have been demonstrated.

Losses resulting from Overestimates.—Excessive estimates of ore in sight not only enable promoters to obtain exorbitant prices for their properties, but most probably

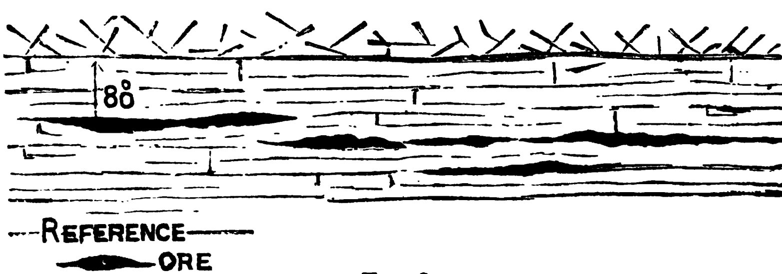


FIG. 8.

induce the purchasers to erect expensive treatment plants, which soon become useless where they stand, and often altogether valueless on account of the cost of removing them. Both these results cause unnecessary expenditure, which means avoidable loss, and therefore they are highly detrimental to honest mining. To put it on no higher plane, that ought to be quite sufficient to induce engineers to keep their estimates within the bounds of fact.

Suggestions.—As a rule, statements as to the quantity of ore in sight, like many other statements in reports, are made so that there is no possible way of checking them without going on to the ground. You have the simple statement that there are so many tons in sight, and you are expected to accept it. That is not as it should be.

Every statement of such quantity should be accompanied by an accurate plan and vertical section on a working scale, which shall indicate the extent of ore to be estimated, and show clearly the ore which is known to exist, as distinguished from that which is only inferred. The width of the pay-chute should be marked on the section at equal distances apart. Samples should also be taken at equal distances. The frequency of both will depend upon the character of the deposit. If variable in form, but fairly uniform in quality, the widths will need to be taken much more frequently than the samples. If the quality is variable, the samples must be taken frequently. The width or length, area and weight, which each sample represents should in every instance be stated. It is important, too, that the lines along which the samples are taken be shown on the plan. Ore-deposits are frequently more or less banded, and often the values vary in the different bands. It is necessary, therefore, that in such deposits the samples be taken across the banding, and not lengthwise of it. If taken in the latter direction, the samples may be wholly from a rich band or wholly from a poor one, and therefore not represent the average quality at that part of the deposit.

If these suggestions be followed we shall hear much less than in the past of errors in estimating ore in sight, for anyone can then check the calculations, and see at a glance what has been observed and what assumed. Only by wilful misrepresentation could the facts then be concealed.

Some people, unfortunately, are incapable of recording facts accurately, either from lack of the necessary training or because their observations are more or less vitiated by all sorts of ideas that are not paralleled by phenomena, so that what is becomes twisted into what, from their point of view, ought to be. Such men would be much more useful in the realms of fiction than in a mine.

Others, again, are more or less capable of making the observations suggested, but, from lack of experience in structural geology, are not in some cases capable of forming a reliable opinion as to the quantity of ore in sight. The work of such men could be checked if their reports were prepared as recommended.

The careless and reckless who might airily write down a few figures in the usual omnibus sentence, as to the quantity of ore in sight—looking upon them probably as a mere matter of opinion—would doubtless feel themselves compelled to go into the matter thoroughly when the facts on which their opinion was based had to be set forth clearly in the manner suggested.

It is also necessary that a statement should be made as to who is responsible for the different data employed—as, for example, who made the geological observations, who took the samples, who made the assays, who supplied the plans. The value to be attached to each part and to the whole can then be fixed with some degree of confidence. It must be evident that if a very able man uses data supplied by one less able or less careful, the conclusions of the former may be of very little value.

In conclusion, the writer wishes it to be clearly understood that this communication is not so much intended to set forth all the methods and precautions needed in estimating ore in sight, many of which can only be determined on the spot, as to urge the importance of having all the observations of fact relied on so set out in the report and accompanying plan that anyone competent to do so may check the results. The effect of such a course will probably be to induce greater care on the part of those responsible for the estimates, and at the same time increase the confidence of those for whom the estimates are made by affording a clear indication of what is meant by "ore in sight" in each particular case.

APPENDIX D

WEIGHTS AND MEASURES USED IN MINING

For Gold and Silver (Troy).

24 grains	= 1 pennyweight (dwt.).
20 dwts.	= 1 ounce (oz.).
1 oz. pure gold . .	= £4 4*s.* 11½*d.*
1 oz. " . .	= $20·67.
Fine gold is . . .	24 carats.
Standard gold is . .	22 "
1 jeweller's carat . .	= 3·17 grains.

For Ore, etc. (Avoir.).

16 ozs.	= 1 lb.
1 English ton . . .	= 2,240 lbs.
1 U.S. ton . . .	= 2,000 lbs.
1 metric ton . . .	= 2,205 lbs.
1 cubic foot . . .	= 1,728 cubic inches.
1 cubic yard . . .	= 27 cubic feet.
1 English ton . . .	= 32,666 troy ounces.
1 U.S. ton . . .	= 29,166 "
19 cubic feet gravel . .	= 1 ton.
22 " pit sand .	= 1 "
11 to 14 cubic feet solid rock	= 1 "
1 fathom	= 6 feet.

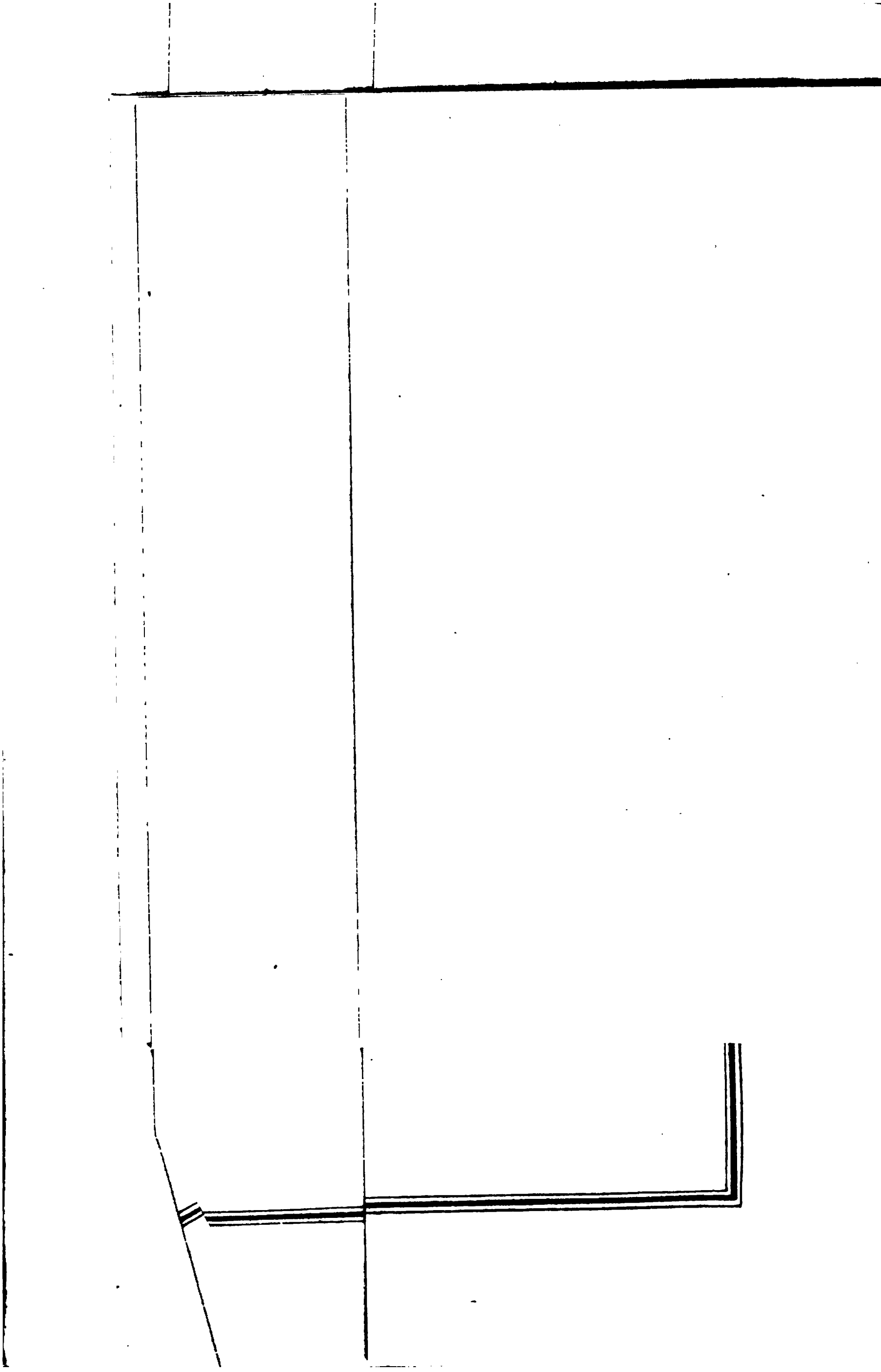
1 stoping fathom is 6 feet square by the width of the vein.

For Water.

1 gallon, English	= 0·16 cubic foot.
1 „ „	weighs 10 lbs.
1 „ U.S.	„ 8·33 lbs.
1 cubic foot	= 6·23 English gallons.
1 „	= 7·48 U.S. gallons.
1 „ water	= 62¼ lbs.
1 miner's inch	= 1½ cubic feet per minute.
1 sluice-head	= 40 miner's inches.

Metrical System.

1 mètre	= 39·37 inches.
1 kilomètre	= 1,093½ yards.
1 „	= 0·62 mile.
1 hectare	= 2·47 acres.
1 gramme	= 15·43 grains.
31·1 grammes	= 1 ounce troy.
1 kilogramme	= 32·1 ounces troy.
1 „	= 2·2 lbs.
1 metric ton	= 2,205 lbs.
1 litre	= 61·02 cubic inches.
1 „	= 0·22 gallon.
4·54 litres	= 1 gallon.



Every statement of such quantity should be accompanied by an accurate plan and vertical section on a working scale, which shall indicate the extent of ore to be estimated, and show clearly the ore which is known to exist, as distinguished from that which is only inferred. The width of the pay-chute should be marked on the section at equal distances apart. Samples should also be taken at equal distances. The frequency of both will depend upon the character of the deposit. If variable in form, but fairly uniform in quality, the widths will need to be taken much more frequently than the samples. If the quality is variable, the samples must be taken frequently. The width or length, area and weight, which each sample represents should in every instance be stated. It is important, too, that the lines along which the samples are taken be shown on the plan. Ore-deposits are frequently more or less banded, and often the values vary in the different bands. It is necessary, therefore, that in such deposits the samples be taken across the banding, and not lengthwise of it. If taken in the latter direction, the samples may be wholly from a rich band or wholly from a poor one, and therefore not represent the average quality at that part of the deposit.

If these suggestions be followed we shall hear much less than in the past of errors in estimating ore in sight, for anyone can then check the calculations, and see at a glance what has been observed and what assumed. Only by wilful misrepresentation could the facts then be concealed.

Some people, unfortunately, are incapable of recording facts accurately, either from lack of the necessary training or because their observations are more or less vitiated by all sorts of ideas that are not paralleled by phenomena, so that what is becomes twisted into what, from their point of view, ought to be. Such men would be much more useful in the realms of fiction than in a mine.

Chert. A variety of flint rock.

Chrysocolla. A combination of copper and silica.

Cinnabar (Vermilion). Composed of quicksilver and sulphur.

Conglomerate (Banket). Rounded pebbles cemented together.

Cuprite (Red Copper Ore). Composed of copper and oxygen.

Dolomite. Limestone containing magnesia.

Embolite. Silver chlorine and bromine.

Erubescite. *See* Bornite.

Fahlerz. *See* Grey Copper.

Fluor Spar. Calcium and fluorine.

Franklinite. Iron, manganese, zinc, and oxygen.

Galena. Lead and sulphur.

Garnet. Composed of iron, alumina, lime, silica.

Grey Copper. Copper antimony and sulphur, and often silver.

Gypsum. Sulphate of lime.

Heavy Spar. *See* Barytes.

Hæmatite. Oxide of iron.

Horseflesh Ore. *See* Bornite.

Ilmenite. Titanic iron; contains iron, titanium, and oxygen.

Kaolin. Light-coloured clay.

Lignite (Brown Coal). An inferior class of coal.

Mispickel. Iron, arsenic, and sulphur.

Molybdenite. Sulphide of molybdenum.

Mundic. *See* Pyrites.

Orpiment. Composed of arsenic and sulphur.

Petzite. A combination of gold, silver, and tellurium.

Pitchblende. An oxide of uranium.

Polybasite. *See* Brittle Silver.

Proustite. *See* Ruby Silver.

Pyrites (Mundic). Iron and sulphur.

Pyrolusite. Black oxide of manganese.

Pyrrhotite (Magnetic Pyrites). Iron and sulphur, sometimes with nickel.

Quartz (Silica). Silicon and oxygen.

Rhodochrosite. Carbonate of manganese.

Rhodonite. Silicate of manganese.

Ruby Silver. A sulphide of silver and antimony.

Rutile. Titanium and oxygen.

Scheelite. Lime, tungsten, and oxygen.

Selenite. *See* Gypsum.

Siderite (Spathic Iron). Carbonate of iron.

Silica. Oxide of silicon, quartz.

Silver Glance. *See* Argentite.

Smithsonite. Carbonate of zinc.

Sphalerite. *See* Blende.

Stannite. Tin pyrites, compound of tin, copper, iron, sulphur.

Stibnite (Grey Antimony). Sulphide of antimony.

Sylvanite. A compound of gold, silver, and tellurium.

Telluride. A combination of tellurium with other metals.

Tetradymite. A telluride of bismuth.

Tetrahedrite. *See* Grey Copper.

Tinstone. *See* Cassiterite.

Tin Pyrites. *See* Stannite.

Uraninnite. *See* Pitchblende.

Wolfram. Iron, manganese, and tungsten, with oxygen.

INDEX

PLYMOUTH
WILLIAM BRENDON AND SON
PRINTERS

A CATALOGUE OF BOOKS PUBLISHED BY METHUEN AND COMPANY: LONDON 36 ESSEX STREET W.C.

CONTENTS

MAY 1909

A CATALOGUE OF

MESSRS. METHUEN'S

PUBLICATIONS

In this Catalogue the order is according to authors. An asterisk denotes that the book is in the press.

Colonial Editions are published of all Messrs. METHUEN's Novels issued at a price above 2s. 6d., and similar editions are published of some works of General Literature. These are marked in the Catalogue. Colonial editions are only for circulation in the British Colonies and India.

All books marked net are not subject to discount, and cannot be bought at less than the published price. Books not marked net are subject to the discount which the bookseller allows.

Messrs. METHUEN's books are kept in stock by all good booksellers. If there is any difficulty in seeing copies, Messrs. Methuen will be very glad to have early information, and specimen copies of any books will be sent on receipt of the published price *plus* postage for net books, and of the published price for ordinary books.

I.P.L. represents Illustrated Pocket Library.

PART I.—GENERAL LITERATURE

Abraham (George D.). THE COMPLETE MOUNTAINEER. With 75 Illustrations. *Second Edition. Demy 8vo.* 15s. *net.*
A Colonial Edition is also published.

Acatos (M. J.). See Junior School Books.

Adams (Frank). JACK SPRAT. With 24 Coloured Pictures. *Super Royal 16mo.* 2s.

Adeney (W. F.), M.A. See Bennett (W. H.)

Ady (Cecilia M.). A HISTORY OF MILAN UNDER THE SFORZA. With 20 Illustrations and a Map. *Demy 8vo.* 10s. 6d. *net.*

Æschylus. See Classical Translations.

Æsop. See I.P.L.

Ainsworth (W. Harrison). See I.P.L.

Aldis (Janet). THE QUEEN OF LETTER WRITERS, MARQUISE DE SÉVIGNÉ, DAME DE BOURBILLY, 1626-96. With 18 Illustrations. *Second Edition. Demy 8vo.* 12s. 6d. *net.*
A Colonial Edition is also published.

Alexander (William), D.D., Archbishop of Armagh. THOUGHTS AND COUNSELS OF MANY YEARS. *Demy 16mo.* 2s. 6d.

Alken (Henry). See I.P.L.

Allen (Charles C.). See Textbooks of Technology.

Allen (L. Jessie). See Little Books on Art.

Allen (J. Romilly), F.S.A. See Antiquary's Books.

Almack (E.), F.S.A. See Little Books on Art.

Amherst (Lady). A SKETCH OF EGYPTIAN HISTORY FROM THE EARLIEST TIMES TO THE PRESENT DAY. With many Illustrations and Maps. *A New and Cheaper Issue Demy 8vo.* 7s. 6d. *net.*

Anderson (F. M.). THE STORY OF THE BRITISH EMPIRE FOR CHILDREN. With 42 Illustrations. *Cr. 8vo.* 2s.

Anderson (J. G.), B.A., NOUVELLE GRAMMAIRE FRANÇAISE, A L'USAGE DES ÉCOLES ANGLAISES. *Crown 8vo.* 2s.
EXERCICES DE GRAMMAIRE FRANÇAISE. *Cr. 8vo.* 1s. 6d.

Andrewes (Bishop). PRECES PRIVATAE. Translated and edited, with Notes, by F. E. BRIGHTMAN. M.A., of Pusey House, Oxford. *Cr. 8vo.* 6s.
See also Library of Devotion.

'Anglo-Australian.' AFTER-GLOW MEMORIES. *Cr. 8vo.* 6s.

Anon. HEALTH, WEALTH, AND WISDOM. *Crown 8vo.* 1s. *net.*

Aristotle. THE ETHICS OF. Edited, with an Introduction and Notes by JOHN BURNET, M.A., *Cheaper issue. Demy 8vo.* 10s. 6d. *net.*

Asman (H. N.), M.A., B.D. See Junior School Books.

Atkins (H. G.). See Oxford Biographies.

Atkinson (C. M.). JEREMY BENTHAM. *Demy 8vo.* 5s. *net.*

***Atkinson (C. T.),** M.A., Fellow of Exeter College, Oxford, sometime Demy of Magdalen College. A HISTORY OF GERMANY, from 1713 to 1815. With many Maps. *Demy 8vo.* 15s. *net.*

Atkinson (T. D.). ENGLISH ARCHITECTURE. With 196 Illustrations *Second Edition. Fcap. 8vo.* 3s. 6d. *net.*
A GLOSSARY OF TERMS USED IN ENGLISH ARCHITECTURE. With 265 Illustrations. *Second Edition. Fcap. 8vo.* 3s. 6d. *net.*

Auden (T.), M.A., F.S.A. See Ancient Cities.

Aurelius (Marcus). WORDS OF THE ANCIENT WISE. Thoughts from Epictetus and Marcus Aurelius. Edited by W. H. D. ROUSE, M.A., Litt. D. *Fcap. 8vo.* 3s. 6d. *net.*
See also Standard Library.

Austen (Jane). See Standard Library, Little Library and Mitton (G. E.).

Aves (Ernest). CO-OPERATIVE INDUSTRY. *Crown 8vo.* 5s. *net.*

Bacon (Francis). See Standard Library and Little Library.

Baden-Powell (R. S. S.) THE MATABELE CAMPAIGN, 1896. With nearly 100 Illustrations. *Fourth Edition. Large Cr. 8vo.* 6s.

Bagot (Richard). THE LAKES OF NORTHERN ITALY. With 37 Illustrations and a Map. *Fcap. 8vo.* 5s. *net.*

Bailey (J. C.), M.A. See Cowper (W.).

Baker (W. G.), M.A. See Junior Examination Series.

Baker (Julian L.), F.I.C., F.C.S. See Books on Business.

Balfour (Graham). THE LIFE OF ROBERT LOUIS STEVENSON. With a Portrait. *Fourth Edition in one Volume. Cr. 8vo. Buckram,* 6s.
A Colonial Edition is also published.

Ballard (A.), B.A., LL.D. See Antiquary's Books.

Bally (S. E.). See Commercial Series.

Banks (Elizabeth L.). THE AUTOBIOGRAPHY OF A 'NEWSPAPER GIRL.' *Second Edition. Cr. 8vo.* 6s.

Barham (R. H.). See Little Library.

Baring (The Hon. Maurice). WITH THE RUSSIANS IN MANCHURIA. *Third Edition. Demy 8vo.* 7s. 6d. *net.*
A Colonial Edition is also published.

A YEAR IN RUSSIA. *Second Edition. Demy 8vo.* 10s. 6d. *net.*
A Colonial Edition is also published.

Baring-Gould (S.). THE LIFE OF NAPOLEON BONAPARTE. With nearly 200 Illustrations, including a Photogravure Frontispiece. *Second Edition. Wide Royal 8vo.* 10s. 6d. *net.*
A Colonial Edition is also published.

THE TRAGEDY OF THE CÆSARS: A STUDY OF THE CHARACTERS OF THE CÆSARS OF THE JULIAN AND CLAUDIAN HOUSES. With numerous Illustrations from Busts, Gems, Cameos, etc. *Sixth Edition. Royal 8vo.* 10s. 6d. *net.*

A BOOK OF FAIRY TALES. With numerous Illustrations by A. J. GASKIN. *Third Edition. Cr. 8vo. Buckram.* 6s., also *Demy 8vo.* 6d.

OLD ENGLISH FAIRY TALES. With numerous Illustrations by F. D. BEDFORD. *Third Edition. Cr. 8vo. Buckram.* 6s.

THE VICAR OF MORWENSTOW. Revised Edition. With a Portrait. *Third Edition. Cr. 8vo.* 3s. 6d.

OLD COUNTRY LIFE. With 69 Illustrations. *Fifth Edition. Large Crown 8vo.* 6s.

A GARLAND OF COUNTRY SONG: English Folk Songs with their Traditional Melodies. Collected and arranged by S. BARING-GOULD and H. F. SHEPPARD. *Demy 4to.* 6s.

SONGS OF THE WEST: Folk Songs of Devon and Cornwall. Collected from the Mouths of the People. By S. BARING-GOULD, M.A., and H. FLEETWOOD SHEPPARD, M.A. New and Revised Edition, under the musical editorship of CECIL J. SHARP. *Large Imperial 8vo.* 5s. *net.*

A BOOK OF NURSERY SONGS AND RHYMES. Edited by S. BARING-GOULD. Illustrated. *Second and Cheaper Edition. Large Cr. 8vo.* 2s. 6d. *net.*

STRANGE SURVIVALS: SOME CHAPTERS IN THE HISTORY OF MAN. Illustrated. *Third Edition. Cr. 8vo.* 2s. 6d. *net.*

YORKSHIRE ODDITIES: INCIDENTS AND STRANGE EVENTS. *Fifth Edition. Cr. 8vo.* 2s. 6d. *net.*

THE BARING-GOULD SELECTION READER. Arranged by G. H. ROSE. Illustrated. *Crown 8vo.* 1s. 6d.

THE BARING-GOULD CONTINUOUS READER. Arranged by G. H. ROSE. Illustrated. *Crown 8vo.* 1s. 6d.

A BOOK OF CORNWALL. With 33 Illustrations. *Second Edition. Cr. 8vo.* 6s.

A BOOK OF DARTMOOR. With 60 Illustrations. *Second Edition. Cr. 8vo.* 6s.

A BOOK OF DEVON. With 35 Illustrations. *Third Edition. Cr. 8vo.* 6s.

A BOOK OF NORTH WALES. With 49 Illustrations. *Cr. 8vo.* 6s.

A BOOK OF SOUTH WALES. With 57 Illustrations. *Cr. 8vo.* 6s.

A BOOK OF BRITTANY. With 69 Illustrations. *Cr. 8vo.* 6s.

A BOOK OF THE RHINE: From Cleve to Mainz. With 8 Illustrations in Colour by TREVOR HADDEN, and 48 other Illustrations. *Second Edition. Cr. 8vo.* 6s.
A Colonial Edition is also published.

A BOOK OF THE RIVIERA. With 40 Illustrations. *Cr. 8vo.* 6s.
A Colonial Edition is also published.

A BOOK OF THE PYRENEES. With 25 Illustrations. *Cr. 8vo.* 6s.
A Colonial Edition is also published.
See also Little Guides.

Barker (Aldred F.). See Textbooks of Technology.

Barker (E.), M.A. (Late) Fellow of Merton College, Oxford. THE POLITICAL THOUGHT OF PLATO AND ARISTOTLE. *Demy 8vo.* 10s. 6d. *net.*

Barnes (W. E.), D.D. See Churchman's Bible.

Barnett (Mrs. P. A.). See Little Library.

Baron (R. R. N.), M.A. FRENCH PROSE COMPOSITION. *Third Edition. Cr 8vo.* 2s. 6d. *Key,* 3s. *net.*
See also Junior School Books.

Barron (H. M.), M.A., Wadham College, Oxford. TEXTS FOR SERMONS. With a Preface by Canon SCOTT HOLLAND. *Cr. 8vo.* 3*s.* 6*d.*

Bartholomew (J. G.), F.R.S.E. See C. G. Robertson.

Bastable (C. F.), LL.D. THE COMMERCE OF NATIONS. *Fourth Ed. Cr. 8vo.* 2*s.* 6*d.*

Bastian (H. Charlton), M.A., M.D., F.R.S. THE EVOLUTION OF LIFE. With Diagrams and many Photomicrographs. *Demy 8vo.* 7*s.* 6*d. net.*

Batson (Mrs. Stephen). A CONCISE HANDBOOK OF GARDEN FLOWERS. *Fcap. 8vo.* 3*s.* 6*d.*

THE SUMMER GARDEN OF PLEASURE. With 36 Illustrations in Colour by OSMUND PITTMAN. *Wide Demy 8vo.* 15*s. net.*

Batten (Loring W.), Ph.D., S.T.D. THE HEBREW PROPHET. *Cr. 8vo.* 3*s.* 6*d. net.*

Bayley (R. Child). THE COMPLETE PHOTOGRAPHER. With over 100 Illustrations. *Third Edition. With Note on Direct Colour Process. Demy 8vo.* 10*s.* 6*d. net.*

A Colonial Edition is also published.

Beard (W. S.). EASY EXERCISES IN ALGEBRA FOR BEGINNERS. *Cr. 8vo.* 1*s.* 6*d.* With Answers. 1*s.* 9*d.*

See also Junior Examination Series and Beginner's Books.

Beckford (Peter). THOUGHTS ON HUNTING. Edited by J. OTHO PAGET, and Illustrated by G. H. JALLAND. *Second Edition. Demy 8vo.* 6*s.*

Beckford (William). See Little Library.

Beeching (H. C.), M.A., Canon of Westminster. See Library of Devotion.

Beerbohm (Max). A BOOK OF CARICATURES. *Imperial 4to.* 21*s. net.*

Begbie (Harold). MASTER WORKERS. Illustrated. *Demy 8vo.* 7*s.* 6*d. net.*

Behmen (Jacob). DIALOGUES ON THE SUPERSENSUAL LIFE. Edited by BERNARD HOLLAND. *Fcap. 8vo.* 3*s.* 6*d.*

Bell (Mrs. Arthur G.). THE SKIRTS OF THE GREAT CITY. With 16 Illustrations in Colour by ARTHUR G. BELL, 17 other Illustrations, and a Map. *Second Edition. Cr. 8vo.* 6*s.*

Belloc (Hilaire), M.P. PARIS. With 7 Maps and a Frontispiece in Photogravure. *Second Edition, Revised. Cr. 8vo.* 6*s.*

HILLS AND THE SEA. *Second Edition. Crown 8vo.* 6*s.*

ON NOTHING AND KINDRED SUBJECTS. *Fcap. 8vo.* 5*s.*

A Colonial Edition is also published.

Bellot (H. H. L.), M.A. See Jones (L. A. A.).

Bennett (W. H.), M.A. A PRIMER OF THE BIBLE. With a concise Bibliography. *Fifth Edition. Cr. 8vo.* 2*s.* 6*d.*

Bennett (W. H.) and Adeney (W. F.). A BIBLICAL INTRODUCTION. *Fifth Edition. Cr. 8vo.* 7*s.* 6*d.*

Benson (Archbishop) GOD'S BOARD Communion Addresses. *Second Edition. Fcap. 8vo.* 3*s.* 6*d. net.*

Benson (A. C.), M.A. See Oxford Biographies.

Benson (R. M.). THE WAY OF HOLINESS: a Devotional Commentary on the 119th Psalm. *Cr. 8vo.* 5*s.*

Bernard (E. R.), M.A., Canon of Salisbury. THE ENGLISH SUNDAY: ITS ORIGINS AND ITS CLAIMS. *Fcap. 8vo.* 1*s.* 6*d.*

Bertouch (Baroness de). THE LIFE OF FATHER IGNATIUS. Illustrated. *Demy 8vo.* 10*s.* 6*d. net.*

Beruete (A. de). See Classics of Art.

Betham-Edwards (Miss). HOME LIFE IN FRANCE. With 20 Illustrations. *Fifth Edition. Crown 8vo.* 6*s.*

A Colonial Edition is also published.

Bethune-Baker (J. F.), M.A. See Handbooks of Theology.

Bidez (J.). See Byzantine Texts.

Biggs (C. R. D.), D.D. See Churchman's Bible.

Bindley (T. Herbert), B.D. THE OECUMENICAL DOCUMENTS OF THE FAITH. With Introductions and Notes. *Second Edition. Cr. 8vo.* 6*s. net.*

Binns (H. B.). THE LIFE OF WALT WHITMAN. Illustrated. *Demy 8vo.* 10*s.* 6*d. net.*

A Colonial Edition is also published.

Binyon (Mrs. Laurence). NINETEENTH CENTURY PROSE. Selected and arranged by. *Crown 8vo.* 6*s.*

Binyon (Laurence). THE DEATH OF ADAM AND OTHER POEMS. *Cr. 8vo.* 3*s.* 6*d. net.*

See also Blake (William).

Birch (Walter de Gray), LL.D., F.S.A. See Connoisseur's Library.

Birnstingl (Ethel). See Little Books on Art.

Blackmantle (Bernard). See I.P.L.

Blair (Robert). See I.P.L.

Blake (William). THE LETTERS OF WILLIAM BLAKE, TOGETHER WITH A LIFE BY FREDERICK TATHAM. Edited from the Original Manuscripts, with an Introduction and Notes, by ARCHIBALD G. B. RUSSELL. With 12 Illustrations. *Demy 8vo.* 7*s.* 6*d. net.*

ILLUSTRATIONS OF THE BOOK OF JOB. With General Introduction by LAURENCE BINYON. *Quarto.* 21*s. net.*

See also Blair (Robert), I.P.L., and Little Library.

Bloom (J. Harvey), M.A. SHAKESPEARE'S GARDEN. Illustrated. *Fcap. 8vo.* 3*s.* 6*d.*; *leather,* 4*s.* 6*d. net.*

See also Antiquary's Books

Blouet (Henri). See Beginner's Books.

Boardman (T. H.), M.A. See French (W.)

Bodley (J. E. C.), Author of 'France.' THE CORONATION OF EDWARD VII. *Demy 8vo.* 21*s. net.* By Command of the King.

Body (George), D.D. THE SOUL'S PILGRIMAGE: Devotional Readings from the Published and Unpublished writings of George Body, D.D. Selected and arranged by J. H. BURN, B.D., F.R.S.E. *Demy 16mo.* 2*s.* 6*d.*

Bona (Cardinal). See Library of Devotion.

Boon (F. C.)., B.A. See Commercial Series.

Borrow (George). See Little Library.

Bos (J. Ritzema). AGRICULTURAL ZOOLOGY. Translated by J. R. AINSWORTH DAVIS, M.A. With 155 Illustrations. *Third Edition. Cr. 8vo.* 3*s.* 6*d.*

Botting (C. G.), B.A. EASY GREEK EXERCISES. *Cr. 8vo.* 2*s.*
See also Junior Examination Series.

Boulting (W.) TASSO AND HIS TIMES. With 24 Illustrations. *Demy 8vo.* 10*s.* 6*d. net.*

Boulton (E. S.), M.A. GEOMETRY ON MODERN LINES. *Cr. 8vo.* 2*s.*

Boulton (William B.). SIR JOSHUA REYNOLDS, P.R.A. With 49 Illustrations. *Demy 8vo.* 7*s.* 6*d. net.*

Bowden (E. M.). THE IMITATION OF BUDDHA: Being Quotations from Buddhist Literature for each Day in the Year. *Fifth Edition. Cr. 16mo.* 2*s.* 6*d.*

Boyle (W.). CHRISTMAS AT THE ZOO. With Verses by W. BOYLE and 24 Coloured Pictures by H. B. NEILSON. *Super Royal 16mo.* 2*s.*

Brabant (F. G.), M.A. See Little Guides.

Bradley (A. G.). ROUND ABOUT WILTSHIRE. With 14 Illustrations, in Colour by T. C. GOTCH, 16 other Illustrations, and a Map. *Second Edition. Cr. 8vo.* 6*s.*
A Colonial Edition is also published.

THE ROMANCE OF NORTHUMBERLAND. With 16 Illustrations in Colour by FRANK SOUTHGATE, R.B.A., and 12 from Photographs. *Second Edition. Demy 8vo* 7*s.* 6*d net.*
A Colonial Edition is also published.

Bradley (John W.). See Little Books on Art.

Braid (James), Open Champion, 1901, 1905 and 1906. ADVANCED GOLF. With 88 Photographs and Diagrams. *Fourth Edition. Demy 8vo.* 10*s.* 6*d. net.*
A Colonial Edition is also published.

Braid (James) and Others. GREAT GOLFERS IN THE MAKING. Edited by HENRY LEACH. With 24 Illustrations. *Second Edition. Demy 8vo.* 7*s.* 6*d. net.*
A Colonial Edition is also published.

Brailsford (H. N.). MACEDONIA: ITS RACES AND THEIR FUTURE. With Photographs and Maps. *Demy 8vo.* 12*s.* 6*d. net.*

Brodrick (Mary) and **Morton (A. Anderson).** A CONCISE DICTIONARY OF EGYPTIAN ARCHÆOLOGY. A Hand-Book for Students and Travellers. With 80 Illustrations and many Cartouches. *Cr. 8vo.* 3*s.* 6*d.*

Brooks (E. E.), B.Sc. (Lond), Leicester Municipal Technical School, and **James (W. H. N.)**, A.R.C.S., A.M.I.E.E., Municipal School of Technology, Manchester. See Textbooks of Technology.

Brooks (E. W.). See Hamilton (F. J.)

Brown (P. H.), LL.D. SCOTLAND IN THE TIME OF QUEEN MARY. *Demy 8vo.* 7*s.* 6*d. net.*

Brown (S. E.), M.A., B.Sc., Senior Science Master at Uppingham. A PRACTICAL CHEMISTRY NOTE-BOOK FOR MATRICULATION AND ARMY CANDIDATES. Easy Experiments on the Commoner Substances. *Cr. 4to.* 1*s.* 6*d. net.*

Brown (J. Wood), M.A. THE BUILDERS OF FLORENCE. With 74 Illustrations by HERBERT RAILTON. *Demy 4to.* 18*s. net.*

Browne (Sir Thomas). See Standard Library.

Brownell (C. L.). THE HEART OF JAPAN. Illustrated. *Third Edition. Cr. 8vo.* 6*s.*; also *Demy 8vo.* 6*d.*

Browning (Robert). See Little Library.

Bryant (Walter W.), B A., F.R.A.S., F.R. Met. Soc., of the Royal Observatory, Greenwich. A HISTORY OF ASTRONOMY. With 35 Illustrations. *Demy 8vo.* 7*s* 6*d. net.*

Buckland (Francis T.). CURIOSITIES OF NATURAL HISTORY. Illustrated by H. B. NEILSON. *Cr. 8vo.* 3*s.* 6*d.*

Buckton (A. M.) THE BURDEN OF ENGELA. *Second Edition. Cr. 8vo.* 3*s* 6*d. net.*

EAGER HEART: A Mystery Play. *Seventh Edition. Cr. 8vo.* 1*s. net.*

KINGS IN BABYLON: A Drama. *Cr. 8vo.* 1*s. net.*

SONGS OF JOY. *Cr. 8vo.* 1*s. net.*

Budge (E. A. Wallis). THE GODS OF THE EGYPTIANS. With over 100 Coloured Plates and many Illustrations. *Two Volumes. Royal 8vo.* £3, 3*s. net.*

Bull (Paul), Army Chaplain. GOD AND OUR SOLDIERS. *Second Edition. Cr. 8vo.* 6*s.*
A Colonial Edition is also published.

Bulley (Miss). See Dilke (Lady).

Bunyan (John). See Standard Library and Library of Devotion.

Burch (G. J.), M.A., F.R.S. A MANUAL OF ELECTRICAL SCIENCE. Illustrated. *Cr. 8vo.* 3*s.*

Burgess (Gelett). GOOPS AND HOW TO BE THEM. Illustrated. *Small 4to.* 6*s.*

Burke (Edmund). See Standard Library.

Burn (A. E.), D.D., Rector of Handsworth and Prebendary of Lichfield. See Handbooks of Theology.

Burn (J. H.), B. D., F. R. S. E. THE CHURCHMAN'S TREASURY OF SONG: Gathered from the Christian poetry of all ages. Edited by. *Fcap. 8vo.* 3*s.* 6*d. net.* See also Library of Devotion.

Burnand (Sir F. C.). RECORDS AND REMINISCENCES. With a Portrait by H. v. HERKOMER. *Cr. 8vo. Fourth and Cheaper Edition.* 6*s.*
A Colonial Edition is also published.

Burns (Robert), THE POEMS. Edited by ANDREW LANG and W. A. CRAIGIE. With Portrait. *Third Edition. Demy 8vo, gilt top.* 6*s.*
See also Standard Library.

Burnside (W. F.), M.A. OLD TESTAMENT HISTORY FOR USE IN SCHOOLS. *Third Edition. Cr. 8vo.* 3*s.* 6*d.*
Burton (Alfred). See I.P.L.
Bussell (F. W.), D.D. CHRISTIAN THEOLOGY AND SOCIAL PROGRESS (The Bampton Lectures of 1905). *Demy 8vo.* 10*s.* 6*d. net.*
Butler (Joseph), D.D. See Standard Library.
Caldecott (Alfred), D.D. See Handbooks of Theology.
Calderwood (D. S.), Headmaster of the Normal School, Edinburgh. TEST CARDS IN EUCLID AND ALGEBRA. In three packets of 40, with Answers. 1*s.* each. Or in three Books, price 2*d.*, 2*d.*, and 3*d.*
Canning (George). See Little Library.
Capey (E. F. H.). See Oxford Biographies.
Careless (John). See I.P.L.
Carlyle (Thomas). THE FRENCH REVOLUTION. Edited by C. R. L. FLETCHER, Fellow of Magdalen College, Oxford. *Three Volumes. Cr. 8vo.* 18*s.*
THE LIFE AND LETTERS OF OLIVER CROMWELL. With an Introduction by C. H. FIRTH, M.A., and Notes and Appendices by Mrs. S. C. LOMAS. *Three Volumes. Demy 8vo.* 18*s. net.*
Carlyle (R. M. and A. J.), M.A. See Leaders of Religion.
Carmichael (Philip). ALL ABOUT PHILIPPINE. With 8 Illustrations. *Cr. 8vo.* 2*s.* 6*d.*
Carpenter (Margaret Boyd). THE CHILD IN ART. With 50 Illustrations. *Second Edition. Large Cr. 8vo.* 6*s.*
Cavanagh (Francis), M.D. (Edin.). THE CARE OF THE BODY. *Second Edition. Demy 8vo.* 7*s.* 6*d. net.*
Celano (Thomas of). THE LIVES OF ST. FRANCIS OF ASSISI. Translated into English by A. G. FERRERS HOWELL. With a Frontispiece. *Cr. 8vo.* 5*s. net.*
Channer (C. C.) and Roberts (M. E.). LACEMAKING IN THE MIDLANDS, PAST AND PRESENT. With 16 full-page Illustrations. *Cr. 8vo.* 2*s.* 6*d.*
Chapman (S. J.). See Books on Business.
Chatterton (Thomas). See Standard Library.
Chesterfield (Lord), THE LETTERS OF, TO HIS SON. Edited, with an Introduction by C. STRACHEY, with Notes by A. CALTHROP. *Two Volumes. Cr. 8vo.* 12*s.*
Chesterton (G. K.). CHARLES DICKENS. With two Portraits in Photogravure. *Fifth Edition. Cr. 8vo.* 6*s.*
Childe (Charles P.), B.A., F.R.C.S. THE CONTROL OF A SCOURGE: OR, HOW CANCER IS CURABLE. *Demy 8vo.* 7*s.* 6*d. net.*
Christian (F. W.). THE CAROLINE ISLANDS. With many Illustrations and Maps. *Demy 8vo.* 12*s.* 6*d. net.*
Cicero. See Classical Translations.
Clapham (J. H.), Professor of Economics in the University of Leeds. THE WOOLLEN AND WORSTED INDUSTRIES. With 21 Illustrations and Diagrams. *Cr. 8vo.* 6*s.*
Clarke (F. A.), M.A. See Leaders of Religion.
Clausen (George), A.R.A., R.W.S. SIX LECTURES ON PAINTING. With 19 Illustrations. *Third Edition. Large Post 8vo.* 3*s.* 6*d. net.*
AIMS AND IDEALS IN ART. Eight Lectures delivered to the Students of the Royal Academy of Arts. With 32 Illustrations. *Second Edition. Large Post 8vo.* 5*s. net.*
Cleather (A. L.). See Wagner (R).
Clinch (G.), F.G.S. See Antiquary's Books and Little Guides.
Clough (W. T.) and **Dunstan (A. E.).** See Junior School Books and Textbooks of Science.
Clouston (T. S.), M.D., C.C.D., F.R.S.E. THE HYGIENE OF MIND. With 10 Illustrations. *Fifth Edition. Demy 8vo.* 7*s.* 6*d. net.*
Coast (W. G.), B.A. EXAMINATION PAPERS IN VERGIL. *Cr. 8vo.* 2*s.*
Cobb (W. F.), M.A. THE BOOK OF PSALMS: with a Commentary. *Demy 8vo.* 10*s.* 6*d. net.*
Coleridge (S. T.). POEMS. Selected and Arranged by ARTHUR SYMONS. With a Photogravure Frontispiece. *Fcap. 8vo.* 2*s.* 6*d. net.*
Collingwood (W. G.), M.A. THE LIFE OF JOHN RUSKIN. With Portrait. *Sixth Edition. Cr. 8vo.* 2*s.* 6*d. net.*
Collins (W. E.), M.A. See Churchman's Library.
Combe (William). See I.P.L.
Conrad (Joseph). THE MIRROR OF THE SEA: Memories and Impressions. *Third Edition. Cr. 8vo.* 6*s.*
Cook (A. M.), M.A., and **Marchant (E. C.)**, M.A. PASSAGES FOR UNSEEN TRANSLATION. Selected from Latin and Greek Literature. *Fourth Ed. Cr. 8vo.* 3*s.* 6*d.*
LATIN PASSAGES FOR UNSEEN TRANSLATION. *Third Ed. Cr. 8vo.* 1*s.* 6*d.*
Cooke-Taylor (R. W.). THE FACTORY SYSTEM. *Cr. 8vo.* 2*s.* 6*d.*
Coolidge (W. A. B.), M.A. THE ALPS. With many Illustrations. *Demy 8vo.* 7*s.* 6*d net.*
A Colonial Edition is also published.
Corelli (Marie). THE PASSING OF THE GREAT QUEEN. *Second Edition. Fcap. 4to.* 1*s.*
A CHRISTMAS GREETING. *Cr. 4to.* 1*s.*
Corkran (Alice). See Little Books on Art.
Cotes (Everard). SIGNS AND PORTENTS IN THE FAR EAST. With 35 Illustrations. *Second Edition. Demy 8vo.* 7*s.* 6*d. net.*
A Colonial Edition is also published.
Cotes (Rosemary). DANTE'S GARDEN. With a Frontispiece. *Second Edition. Fcap. 8vo.* 2*s.* 6*d.*; *leather*, 3*s.* 6*d. net.*
BIBLE FLOWERS. With a Frontispiece and Plan. *Fcap. 8vo.* 2*s.* 6*d. net.*

Cowley (Abraham). See Little Library.

Cowper (William). THE POEMS. Edited with an Introduction and Notes by J. C. BAILEY, M.A. Illustrated, including two unpublished designs by WILLIAM BLAKE. *Demy 8vo.* 10*s.* 6*d. net.*

Cox (J. Charles). See Ancient Cities, Antiquary's Books, and Little Guides.

Cox (Harold), B.A., M.P. LAND NATIONALIZATION AND LAND TAXATION. *Second Edition revised. Cr. 8vo.* 3*s.* 6*d. net.*

Crabbe (George). See Little Library.

Craik (Mrs.). See Little Library.

Crane (C. P.), D.S.O. See Little Guides.

Crane (Walter), R.W.S. AN ARTIST'S REMINISCENCES. With 123 Illustrations by the Author and others from Photographs. *Second Edition. Demy 8vo.* 18*s. net.*

A Colonial Edition is also published.

INDIA IMPRESSIONS. With 84 Illustrations from Sketches by the Author. *Second Edition. Demy 8vo.* 7*s.* 6*d. net.*

A Colonial Edition is also published.

Crashaw (Richard). See Little Library.

Crawford (F. G.). See Danson (Mary C.).

Crofts (T. R. N.), M.A., Modern Language Master at Merchant Taylors' School. See Simplified French Texts.

Cross (J. A.), M.A. THE FAITH OF THE BIBLE. *Fcap. 8vo.* 2*s.* 6*d. net.*

Cruikshank (G.). THE LOVING BALLAD OF LORD BATEMAN. With 11 Plates. *Cr. 16mo.* 1*s.* 6*d. net.*

Crump (B.). See Wagner (R.).

Cunliffe (Sir F. H. E.), Fellow of All Souls' College, Oxford. THE HISTORY OF THE BOER WAR. With many Illustrations, Plans, and Portraits. *In 2 vols. Quarto.* Vol. I. 15*s.*

Cunynghame (H. H.), C.B. See Connoisseur's Library.

Cutts (E. L.), D.D. See Leaders of Religion.

Daniell (G. W.), M.A. See Leaders of Religion.

Dante (Alighieri). LA COMMEDIA DI DANTE. The Italian Text edited by PAGET TOYNBEE, M.A., D.Litt. *Cr. 8vo.* 6*s.*

THE DIVINE COMEDY. Translated by H. F. CARY. Edited with a Life of Dante and Introductory Notes by PAGET TOYNBEE, M.A., D.Litt. *Demy 8vo.* 6*d.*

THE PURGATORIO OF DANTE. Translated into Spenserian Prose by C. GORDON WRIGHT. With the Italian text. *Fcap. 8vo.* 2*s.* 6*d. net.*

See also Little Library, Toynbee (Paget), and Vernon (Hon. W. Warren).

Darley (George). See Little Library.

D'Arcy (R. F.), M.A. A NEW TRIGONOMETRY FOR BEGINNERS. With numerous diagrams. *Cr. 8vo.* 2*s.* 6*d.*

Davenport (Cyril). See Connoisseur's Library and Little Books on Art.

Davenport (James). THE WASHBOURNE FAMILY. With 15 Illustrations and a Map. *Royal 8vo.* 21*s. net.*

Davey (Richard). THE PAGEANT OF LONDON. With 40 Illustrations in Colour by JOHN FULLEYLOVE, R.I. *In Two Volumes. Demy 8vo.* 15*s. net.*

Davis (H. W. C.), M.A., Fellow and Tutor of Balliol College. ENGLAND UNDER THE NORMANS AND ANGEVINS: 1066-1272. With Maps and Illustrations. *Demy 8vo.* 10*s.* 6*d. net.*

Dawson (Nelson). See Connoisseur's Library.

Dawson (Mrs. Nelson). See Little Books on Art.

Deane (A. C.). See Little Library.

Deans (Storry R.). THE TRIALS OF FIVE QUEENS: KATHARINE OF ARAGON, ANNE BOLEYN, MARY QUEEN OF SCOTS, MARIE ANTOINETTE and CAROLINE OF BRUNSWICK. With 12 Illustrations. *Demy 8vo.* 10*s.* 6*d. net.*

A Colonial Edition is also published.

Dearmer (Mabel). A CHILD'S LIFE OF CHRIST. With 8 Illustrations in Colour by E. FORTESCUE-BRICKDALE. *Large Cr. 8vo.* 6*s.*

Delbos (Leon). THE METRIC SYSTEM. *Cr. 8vo.* 2*s.*

Demosthenes. AGAINST CONON AND CALLICLES. Edited by F. DARWIN SWIFT, M.A. *Second Edition. Fcap. 8vo.* 2*s.*

Dickens (Charles). See Little Library, I.P.L., and Chesterton (G. K.).

Dickinson (Emily). POEMS. *Cr. 8vo.* 4*s.* 6*d. net.*

Dickinson (G. L.), M.A., Fellow of King's College, Cambridge. THE GREEK VIEW OF LIFE. *Sixth Edition. Cr. 8vo.* 2*s.* 6*d.*

Dilke (Lady), Bulley (Miss), and Whitley (Miss). WOMEN'S WORK. *Cr. 8vo.* 2*s.* 6*d.*

Dillon (Edward), M.A. See Connoisseur's Library and Little Books on Art.

Ditchfield (P. H.), M.A., F.S.A. THE STORY OF OUR ENGLISH TOWNS. With an Introduction by AUGUSTUS JESSOPP, D.D. *Second Edition. Cr. 8vo.* 6*s.*

OLD ENGLISH CUSTOMS: Extant at the Present Time. *Cr. 8vo.* 6*s.*

ENGLISH VILLAGES. With 100 Illustrations. *Second Edition. Cr. 8vo.* 2*s.* 6*d. net.*

THE PARISH CLERK. With 31 Illustrations. *Third Edition. Demy 8vo.* 7*s.* 6*d. net.*

Dixon (W. M.), M.A. A PRIMER OF TENNYSON. *Second Edition. Cr. 8vo.* 2*s.* 6*d.*

ENGLISH POETRY FROM BLAKE TO BROWNING. *Second Edition. Cr. 8vo.* 2*s.* 6*d.*

Dobbs (W. J.), M.A. See Textbooks of Science.

Doney (May). SONGS OF THE REAL. *Cr. 8vo.* 3*s.* 6*d. net.*

Douglas (Hugh A.). VENICE ON FOOT. With the Itinerary of the Grand Canal. With 75 Illustrations and 11 Maps. *Fcap. 8vo.* 5*s. net.*

Douglas (James). THE MAN IN THE PULPIT. *Cr.* 8*vo.* 2*s.* 6*d. net.*

Dowden (J.), D.D., Lord Bishop of Edinburgh. FURTHER STUDIES IN THE PRAYER BOOK. *Cr.* 8*vo.* 6*s.*
See also Churchman's Library.

Drage (G.). See Books on Business.

Draper (F. W. M.). See Simplified French Texts.

Driver (S. R.), D.D., D.C.L., Regius Professor of Hebrew in the University of Oxford. SERMONS ON SUBJECTS CONNECTED WITH THE OLD TESTAMENT. *Cr.* 8*vo.* 6*s.*
See also Westminster Commentaries.

Dry (Wakeling). See Little Guides.

Dryhurst (A. R.). See Little Books on Art.

Du Buisson (J. C.), M.A. See Churchman's Bible.

Duguid (Charles). See Books on Business.

Dumas (Alexandre). THE CRIMES OF THE BORGIAS AND OTHERS. With an Introduction by R. S. GARNETT. With 9 Illustrations. *Cr.* 8*vo.* 6*s.*

THE CRIMES OF URBAIN GRANDIER AND OTHERS. With 8 Illustrations. *Cr.* 8*vo.* 6*s.*

THE CRIMES OF THE MARQUISE DE BRINVILLIERS AND OTHERS. With 8 Illustrations. *Cr.* 8*vo.* 6*s.*

THE CRIMES OF ALI PACHA AND OTHERS. With 8 Illustrations. *Cr.* 8*vo.* 6*s.*
Colonial Editions are also published.

MY MEMOIRS. Translated by E. M. WALLER. With an Introduction by ANDREW LANG. With Frontispieces in Photogravure. In six Volumes. *Cr.* 8*vo.* 6*s. each volume.*
A Colonial Edition is also published.
VOL. I. 1802-1821. VOL. III. 1826-1830.
VOL. II. 1822-1825. VOL. IV. 1830-1831.

Duncan (David), D.Sc., LL.D. THE LIFE AND LETTERS OF HERBERT SPENCER. With 15 Illustrations. *Demy* 8*vo.* 15*s.*

Dunn (J. T)., D.Sc., **and Mundella (V. A.).** GENERAL ELEMENTARY SCIENCE. With 114 Illustrations. *Second Edition. Cr.* 8*vo.* 3*s.* 6*d.*

Dunstan (A. E.), B.Sc. (Lond.), East Ham Technical College. See Textbooks of Science, and Junior School Books.

Durham (The Earl of). A REPORT ON CANADA. With an Introductory Note. *Demy* 8*vo.* 4*s.* 6*d. net.*

Dutt (W. A.). THE NORFOLK BROADS. With coloured Illustrations by FRANK SOUTHGATE, R.B.A. *Second Edition. Cr.* 8*vo.* 6*s.*

WILD LIFE IN EAST ANGLIA. With 16 Illustrations in colour by FRANK SOUTHGATE, R.B.A. *Second Edition. Demy* 8*vo.* 7*s.* 6*d. net.*

SOME LITERARY ASSOCIATIONS OF EAST ANGLIA. With 16 Illustrations in Colour by W. DEXTER, R.B.A., and 16 other Illustrations. *Demy* 8*vo.* 10*s.* 6*d. net.*
See also Little Guides.

Earle (John), Bishop of Salisbury. MICROCOSMOGRAPHIE, OR A PIECE OF THE WORLD DISCOVERED. *Post* 16*mo.* 2*s. net.*

Edmonds (Major J. E.), R.E.; D.A.Q.-M.G. See Wood (W. Birkbeck).

Edwards (Clement), M.P. RAILWAY NATIONALIZATION. *Second Edition, Revised. Crown* 8*vo.* 2*s.* 6*d. net.*

Edwards (W. Douglas). See Commercial Series.

Edwardes (Tickner). THE LORE OF THE HONEY BEE. With many Illustrations. *Cr.* 8*vo.* 6*s.*

Egan (Pierce). See I.P.L.

Egerton (H. E.), M.A. A HISTORY OF BRITISH COLONIAL POLICY. A Cheaper Issue, with a supplementary chapter. *Second Ed., Revised. Demy* 8*vo.* 7*s.* 6*d. net.*
A Colonial Edition is also published.

Ellaby (C. G.). See Little Guides.

Ellerton (F. G.). See Stone (S. J.).

Epictetus. See Aurelius (Marcus).

Erasmus. A Book called in Latin ENCHIRIDION MILITIS CHRISTIANI, and in English the Manual of the Christian Knight. *Fcap.* 8*vo.* 3*s.* 6*d. net.*

Ewald (Carl). TWO LEGS, AND OTHER STORIES. Translated from the Danish by ALEXANDER TEIXEIRA DE MATTOS. Illustrated by AUGUSTA GUEST. *Large Cr.* 8*vo.* 6*s.*

Fairbrother (W. H.), M.A. THE PHILOSOPHY OF T. H. GREEN. *Second Edition. Cr.* 8*vo.* 3*s.* 6*d.*

Fea (Allan). SOME BEAUTIES OF THE SEVENTEENTH CENTURY. With 82 Illustrations. *Second Edition. Demy* 8*vo.* 12*s.* 6*d. net.*

THE FLIGHT OF THE KING. With over 70 Sketches and Photographs by the Author. *New and revised Edition. Demy* 8*vo.* 7*s.* 6*d. net.*
A Colonial Edition is also published.

SECRET CHAMBERS AND HIDING-PLACES. With 80 Illustrations. *New and revised Edition. Demy* 8*vo.* 7*s.* 6*d. net.*
A Colonial Edition is also published.

Ferrier (Susan). See Little Library.

Fidler (T. Claxton), M.Inst. C.E. See Books on Business.

Fielding (Henry). See Standard Library.

Finn (S. W.), M.A. See Junior Examination Series.

Firth (J. B.). See Little Guides.

Firth (C. H.), M.A., Regius Professor of Modern History at Oxford. CROMWELL'S ARMY: A History of the English Soldier during the Civil Wars, the Commonwealth, and the Protectorate. *Cr.* 8*vo.* 6*s.*

Firth (Edith E.). See Beginner's Books.

FitzGerald (Edward). THE RUBÁIYÁT OF OMAR KHAYYÁM. Printed from the Fifth and last Edition. With a Commentary by Mrs. STEPHEN BATSON, and a Biography of Omar by E. D. ROSS. *Cr.* 8*vo.* 6*s.* See also Miniature Library.

FitzGerald (H. P.). A CONCISE HANDBOOK OF CLIMBERS, TWINERS, AND WALL SHRUBS. Illustrated. *Fcap. 8vo.* 3s. 6d. net.

Fitzpatrick (S. A. O.). See Ancient Cities.

Flecker (W. H.), M.A., D.C.L., Headmaster of the Dean Close School, Cheltenham. THE STUDENT'S PRAYER BOOK. THE TEXT OF MORNING AND EVENING PRAYER AND LITANY. With an Introduction and Notes. *Cr. 8vo.* 2s. 6d.

Fletcher (J. S.). A BOOK OF YORKSHIRE. With 16 Illustrations in Colour by WAL PAGET and FRANK SOUTHGATE, R.B.A., and 12 from Photographs. *Demy 8vo.* 7s. 6d. net.

A Colonial Edition is also published.

Flux (A. W.), M.A., William Dow Professor of Political Economy in M'Gill University, Montreal. ECONOMIC PRINCIPLES. *Demy 8vo.* 7s. 6d. net.

Foat (F. W. G.), D.Litt., M.A., Assistant Master at the City of London School. LONDON: A READER FOR YOUNG CITIZENS. With Plans and Illustrations. *Cr. 8vo.* 1s. 6d.

Ford (H. G.), M.A., Assistant Master at Bristol Grammar School. See Junior School Books.

Forel (A.). THE SENSES OF INSECTS. Translated by MACLEOD YEARSLEY. With 2 Illustrations. *Demy 8vo.* 10s. 6d. net.

Fortescue (Mrs. G.). See Little Books on Art.

Fraser (J. F.). ROUND THE WORLD ON A WHEEL. With 100 Illustrations. *Fifth Edition Cr. 8vo.* 6s.

A Colonial Edition is also published.

French (W.), M.A. See Textbooks of Science.

Freudenreich (Ed. von). DAIRY BACTERIOLOGY. A Short Manual for Students. Translated by J. R. AINSWORTH DAVIS, M.A. *Second Edition. Revised. Cr. 8vo.* 2s. 6d.

Fulford (H. W.), M.A. See Churchman's Bible.

Fuller (W. P.), M.A. See Simplified French Texts.

Fyvie (John). TRAGEDY QUEENS OF THE GEORGIAN ERA. With 16 Illustrations. *Second Ed. Demy 8vo.* 12s. 6d. net.

Gallaher (D.) and Stead (W. J.). THE COMPLETE RUGBY FOOTBALLER, ON THE NEW ZEALAND SYSTEM. With 35 Illustrations. *Second Ed. Demy 8vo.* 10s. 6d. net.

A Colonial Edition is also published.

Gallichan (W. M.). See Little Guides.

Gambado (Geoffrey, Esq.). See I.P.L.

Gaskell (Mrs.). See Little Library, Standard Library and Sixpenny Novels.

Gasquet, the Right Rev. Abbot, O.S.B. See Antiquary's Books.

George (H. B.), M.A., Fellow of New College, Oxford. BATTLES OF ENGLISH HISTORY. With numerous Plans. *Fourth Edition. Cr. 8vo.* 3s. 6d.

A HISTORICAL GEOGRAPHY OF THE BRITISH EMPIRE. *Third Edition. Cr. 8vo.* 3s. 6d.

Gibbins (H. de B.), Litt.D., M.A. INDUSTRY IN ENGLAND: HISTORICAL OUTLINES. With 5 Maps. *Fifth Edition. Demy 8vo.* 10s. 6d.

THE INDUSTRIAL HISTORY OF ENGLAND. With Maps and Plans. *Fifteenth Edition, Revised. Cr. 8vo.* 3s.

ENGLISH SOCIAL REFORMERS. *Second Edition. Cr. 8vo.* 2s. 6d.

See also Hadfield (R. A.), and Commercial Series.

Gibbon (Edward). MEMOIRS OF MY LIFE AND WRITINGS. Edited by G. BIRKBECK HILL, LL.D *Cr. 8vo.* 6s.

THE DECLINE AND FALL OF THE ROMAN EMPIRE. Edited, with Notes, Appendices, and Maps, by J. B. BURY, M.A., Litt.D., Regius Professor of Modern History at Cambridge. *In Seven Volumes. Demy 8vo. Gilt top.* 8s. 6d. *each. Also, Crown 8vo.* 6s. *each.*

See also Standard Library.

Gibbs (Philip). THE ROMANCE OF GEORGE VILLIERS: FIRST DUKE OF BUCKINGHAM, AND SOME MEN AND WOMEN OF THE STUART COURT. With 20 Illustrations. *Second Edition. Demy 8vo.* 15s. net.

A Colonial Edition is also published.

Gibson (E. C. S.), D.D., Lord Bishop of Gloucester. See Westminster Commentaries, Handbooks of Theology, and Oxford Biographies.

Gilbert (A. R.). See Little Books on Art.

Gloag (M. R.) and Wyatt (Kate M.). A BOOK OF ENGLISH GARDENS. With 24 Illustrations in Colour. *Demy 8vo.* 10s. 6d. net.

Godfrey (Elizabeth). A BOOK OF REMEMBRANCE. Being Lyrical Selections for every day in the Year. Arranged by. *Fcap. 8vo.* 2s. 6d. net.

ENGLISH CHILDREN IN THE OLDEN TIME. With 32 Illustrations. *Second Edition. Demy 8vo.* 7s. 6d. net.

Godley (A. D.), M.A., Fellow of Magdalen College, Oxford. LYRA FRIVOLA. *Fourth Edition. Fcap. 8vo.* 2s. 6d.

VERSES TO ORDER. *Second Edition. Fcap. 8vo.* 2s. 6d.

SECOND STRINGS. *Fcap. 8vo.* 2s. 6d.

Goldsmith (Oliver). THE VICAR OF WAKEFIELD. With 10 Plates in Photogravure by Tony Johannot. *Leather, Fcap. 32mo.* 2s. 6d. net.

See also I.P.L. and Standard Library.

Gomme (G. L.). See Antiquary's Books.

Goodrich-Freer (A.). IN A SYRIAN SADDLE. *Demy 8vo.* 7s. 6d. net.

A Colonial Edition is also published.

Gorst (Rt. Hon. Sir John). THE CHILDREN OF THE NATION. *Second Edition. Demy 8vo.* 7s. 6d. net.

Goudge (H. L.), M.A., Principal of Wells Theological College. See Westminster Commentaries.

Graham (P. Anderson). THE RURAL EXODUS. The Problem of the Village and the Town. *Cr. 8vo.* 2s. 6d.

Granger (F. S.), M.A., Litt.D. PSYCHOLOGY. *Third Edition. Cr. 8vo.* 2s. 6d.

THE SOUL OF A CHRISTIAN. *Cr. 8vo.* 6s.

Gray (E. M'Queen). GERMAN PASSAGES FOR UNSEEN TRANSLATION. *Cr. 8vo.* 2s. 6d.

Gray (P. L.), B.Sc. THE PRINCIPLES OF MAGNETISM AND ELECTRICITY. With 181 Diagrams. *Cr. 8vo.* 3s. 6d.

Green (G. Buckland), M.A., late Fellow of St. John's College, Oxon. NOTES ON GREEK AND LATIN SYNTAX. *Second Ed. revised. Crown 8vo.* 3s. 6d.

Greenidge (A. H. J.), M.A., D.Litt. A HISTORY OF ROME: From the Tribunate of Tiberius Gracchus to the end of the Jugurthine War, B.C. 133-104. *Demy 8vo.* 10s. 6d. *net.*

Greenwell (Dora). See Miniature Library.

Gregory (R. A.). THE VAULT OF HEAVEN. A Popular Introduction to Astronomy. Illustrated. *Cr. 8vo.* 2s. 6d.

Gregory (Miss E. C.). See Library of Devotion.

Grubb (H. C.). See Textbooks of Technology.

Hadfield (R. A.) and Gibbins (H. de B.). A SHORTER WORKING DAY. *Cr. 8vo.* 2s. 6d.

Hall (Mary). A WOMAN'S TREK FROM THE CAPE TO CAIRO. With 64 Illustrations and 2 Maps. *Second Edition. Demy 8vo.* 16s. *net.*

Hall (R. N.) and Neal (W. G.). THE ANCIENT RUINS OF RHODESIA. Illustrated. *Second Edition, revised. Demy 8vo.* 10s. 6d. *net.*
A Colonial Edition is also published.

Hall (R. N.). GREAT ZIMBABWE. With numerous Plans and Illustrations. *Second Edition. Demy 8vo.* 10s. 6d. *net.*

Hamel (Frank). FAMOUS FRENCH SALONS. With 20 Illustrations. *Third Edition. Demy 8vo.* 12s. 6d. *net.*
A Colonial Edition is also published.

Hamilton (F. J.), D.D. See Byzantine Texts.

Hannay (D.). A SHORT HISTORY OF THE ROYAL NAVY, 1200-1688. Illustrated. *Demy 8vo.* 7s. 6d. *net.*

Hannay (James O.), M.A. THE SPIRIT AND ORIGIN OF CHRISTIAN MONASTICISM. *Cr. 8vo.* 6s.

THE WISDOM OF THE DESERT. *Fcap. 8vo.* 3s. 6d. *net.*

Hardie (Martin). See Connoisseur's Library.

Hare (A. T.), M.A. THE CONSTRUCTION OF LARGE INDUCTION COILS. With numerous Diagrams. *Demy 8vo.* 6s.

Harvey (Alfred), M.B. See Ancient Cities and Antiquary's Books.

Hawthorne (Nathaniel). See Little Library.

Heath (Frank R.). See Little Guides.

Heath (Dudley). See Connoisseur's Library.

Hello (Ernest). STUDIES IN SAINTSHIP. *Fcap 8vo.* 3s. 6d.

Henderson (B. W.), Fellow of Exeter College, Oxford. THE LIFE AND PRINCIPATE OF THE EMPEROR NERO. Illustrated. *New and cheaper issue. Demy 8vo.* 7s. 6d. *net.*

AT INTERVALS. *Fcap 8vo.* 2s. 6d. *net.*

Henderson (M. Sturge). GEORGE MEREDITH: NOVELIST, POET, REFORMER. With a Portrait in Photogravure. *Second Edition. Crown 8vo.* 6s.

Henderson (T. F.). See Little Library and Oxford Biographies.

Henderson (T. F.), and Watt (Francis). SCOTLAND OF TO-DAY. With 20 Illustrations in colour and 24 other Illustrations. *Second Edition. Cr. 8vo.* 6s.
A Colonial Edition is also published.

Henley (W. E.). ENGLISH LYRICS. CHAUCER TO POE, 1340-1849. *Second Edition. Cr. 8vo.* 2s. 6d. *net.*

Henley (W. E.) and Whibley (C.) A BOOK OF ENGLISH PROSE, CHARACTER, AND INCIDENT, 1387-1649. *Cr. 8vo.* 2s. 6d. *net.*

Henson (H. H.), B.D., Canon of Westminster. LIGHT AND LEAVEN: HISTORICAL AND SOCIAL SERMONS. *Cr. 8vo.* 6s.

Herbert (George). See Library of Devotion.

Herbert of Cherbury (Lord). See Miniature Library.

Hewins (W. A. S.), B.A. ENGLISH TRADE AND FINANCE IN THE SEVENTEENTH CENTURY. *Cr. 8vo.* 2s. 6d.

Hewitt (Ethel M.) A GOLDEN DIAL. A Day Book of Prose and Verse. *Fcap. 8vo.* 2s. 6d. *net.*

Hey (H.), Inspector, Surrey Education Committee, and **Rose (G. H.),** City and Guilds Woodwork Teacher. THE MANUAL TRAINING CLASSROOM: WOODWORK. Book I. *4to.* 1s.

Heywood (W.). See St. Francis of Assisi.

Hill (Clare). See Textbooks of Technology.

Hill (Henry), B.A., Headmaster of the Boy's High School, Worcester, Cape Colony. A SOUTH AFRICAN ARITHMETIC. *Cr. 8vo.* 3s. 6d.

Hind (C. Lewis). DAYS IN CORNWALL. With 16 Illustrations in Colour by WILLIAM PASCOE, and 20 other Illustrations and a Map. *Second Edition. Cr. 8vo.* 6s.

Hirst (F. W.) See Books on Business.

Hoare (J. Douglas). A HISTORY OF ARCTIC EXPLORATION. With 20 Illustrations & Maps. *Demy 8vo.* 7s. 6d. *net.*

Hobhouse (L. T.), late Fellow of C.C.C., Oxford. THE THEORY OF KNOWLEDGE. *Demy 8vo.* 10s. 6d. *net.*

Hobson (J. A.), M.A. INTERNATIONAL TRADE: A Study of Economic Principles. *Cr. 8vo.* 2s. 6d. *net.*

PROBLEMS OF POVERTY. An Inquiry into the Industrial Condition of the Poor. *Seventh Edition. Cr. 8vo.* 2s. 6d.

THE PROBLEM OF THE UNEMPLOYED. *Fourth Edition. Cr. 8vo.* 2*s*. 6*d*.

Hodgetts (E. A. Brayley). THE COURT OF RUSSIA IN THE NINETEENTH CENTURY. With 20 Illustrations. *Two Volumes. Demy 8vo.* 24*s*. *net*.
A Colonial Edition is also published.

Hodgkin (T.), D.C.L. See Leaders of Religion.

Hodgson (Mrs. W.) HOW TO IDENTIFY OLD CHINESE PORCELAIN. With 40 Illustrations. *Second Edition. Post 8vo.* 6*s*.

Holden-Stone (G. de). See Books on Business.

Holdich (Sir T. H.), K.C.I.E. THE INDIAN BORDERLAND: being a Personal Record of Twenty Years. Illustrated. *Demy 8vo.* 10*s*. 6*d*. *net*.
A Colonial Edition is also published.

Holdsworth (W. S.), M.A. A HISTORY OF ENGLISH LAW. *In Two Volumes. Vol. I. Demy 8vo.* 10*s*. 6*d*. *net*.

Holland (H. Scott), Canon of St. Paul's. See Newman (J. H.).

Hollway-Calthrop (H. C.), late of Balliol College, Oxford; Bursar of Eton College. PETRARCH: HIS LIFE, WORK, AND TIMES. With 24 Illustrations. *Demy 8vo.* 12*s*. 6*d*. *net*.
A Colonial Edition is also published.

Holt (Emily). THE SECRET OF POPULARITY: How to Achieve Social Success. *Cr. 8vo.* 3*s*. 6*d*. *net*.
A Colonial Edition is also published.

Holyoake (G. J.). THE CO-OPERATIVE MOVEMENT OF TO-DAY. *Fourth Ed. Cr. 8vo.* 2*s*. 6*d*.

Hone (Nathaniel J.). See Antiquary's Books.

Hook (A.) HUMANITY AND ITS PROBLEMS. *Cr. 8vo.* 5*s*. *net*.

Hoppner. See Little Galleries.

Horace. See Classical Translations.

Horsburgh (E. L. S.), M.A. WATERLOO: With Plans. *Second Edition. Cr. 8vo.* 5*s*.
See also Oxford Biographies.

Horth (A. C.). See Textbooks of Technology.

Horton (R. F.), D.D. See Leaders of Religion.

Hosie (Alexander). MANCHURIA. With Illustrations and a Map. *Second Edition. Demy 8vo.* 7*s*. 6*d*. *net*.
A Colonial Edition is also published.

How (F. D.). SIX GREAT SCHOOLMASTERS. With Portraits and Illustrations. *Second Edition. Demy 8vo.* 7*s*. 6*d*.

Howell (A. G. Ferrers). FRANCISCAN DAYS. Being Selections for every day in the year from ancient Franciscan writings. *Cr. 8vo.* 3*s*. 6*d*. *net*.

Howell (G.). TRADE UNIONISM—NEW AND OLD. *Fourth Edition. Cr. 8vo.* 2*s*. 6*d*.

Huggins (Sir William), K.C.B., O.M., D.C.L., F.R.S. THE ROYAL SOCIETY. With 25 Illustrations. *Wide Royal 8vo.* 4*s*. 6*d*. *net*.

Hughes (C. E.). THE PRAISE OF SHAKESPEARE. An English Anthology. With a Preface by SIDNEY LEE. *Demy 8vo.* 3*s*. 6*d*. *net*.

Hughes (Thomas). TOM BROWN'S SCHOOLDAYS. With an Introduction and Notes by VERNON RENDALL. *Leather. Royal 32mo.* 2*s*. 6*d*. *net*.

Hutchinson (Horace G.) THE NEW FOREST. Illustrated in colour with 50 Pictures by WALTER TYNDALE and 4 by LUCY KEMP-WELCH. *Third Edition. Cr. 8vo.* 6*s*.

Hutton (A. W.), M.A. See Leaders of Religion and Library of Devotion.

Hutton (Edward). THE CITIES OF UMBRIA. With 20 Illustrations in Colour by A. PISA, and 12 other Illustrations. *Third Edition. Cr. 8vo.* 6*s*.
A Colonial Edition is also published.

THE CITIES OF SPAIN. With 24 Illustrations in Colour, by A. W. RIMINGTON, 20 other Illustrations and a Map. *Third Edition. Cr. 8vo.* 6*s*.
A Colonial Edition is also published.

FLORENCE AND THE CITIES OF NORTHERN TUSCANY, WITH GENOA. With 16 Illustrations in Colour by WILLIAM PARKINSON, and 16 other Illustrations. *Second Edition. Cr. 8vo.* 6*s*
A Colonial Edition is also published.

ENGLISH LOVE POEMS. Edited with an Introduction. *Fcap. 8vo.* 3*s*. 6*d*. *net*.

Hutton (R. H.). See Leaders of Religion.

Hutton (W. H.), M.A. THE LIFE OF SIR THOMAS MORE. With Portraits after Drawings by HOLBEIN. *Second Ed. Cr. 8vo.* 5*s*.
See also Leaders of Religion.

Hyde (A. G.) GEORGE HERBERT AND HIS TIMES. With 32 Illustrations. *Demy 8vo.* 10*s*. 6*d*. *net*.

Hyett (F. A.). FLORENCE: HER HISTORY AND ART TO THE FALL OF THE REPUBLIC. *Demy 8vo.* 7*s*. 6*d*. *net*.

Ibsen (Henrik). BRAND. A Drama. Translated by WILLIAM WILSON. *Third Edition. Cr. 8vo.* 3*s*. 6*d*.

Inge (W. R.), M.A., Fellow and Tutor of Hertford College, Oxford. CHRISTIAN MYSTICISM. (The Bampton Lectures of 1899.) *Demy 8vo.* 12*s*. 6*d*. *net*.
See also Library of Devotion.

Ingham (B. P.). See Simplified French Texts.

Innes (A. D.), M.A. A HISTORY OF THE BRITISH IN INDIA. With Maps and Plans. *Cr. 8vo.* 6*s*.

ENGLAND UNDER THE TUDORS. With Maps. *Second Edition. Demy 8vo.* 10*s*. 6*d*. *net*.

Jackson (C. E.), B.A., Senior Physics Maste Bradford Grammar School.
of Science.

Jackson (S.), M.A. See Commercial Series.

Jackson (F. Hamilton). See Little Guides.

Jacob (F.), M.A. See Junior Examination Series.

James (W. H. N.). See Brooks (E. E.).

Jeans (J. Stephen). TRUSTS, POOLS, AND CORNERS AS AFFECTING COMMERCE AND INDUSTRY. *Cr. 8vo.* 2s. 6d.
See also Books on Business.

Jebb (Camilla). A STAR OF THE SALONS: JULIE DE LESPINASSE. With 20 Illustrations. *Demy 8vo.* 10s. 6d. *net.*
A Colonial Edition is also published.

Jeffery (Reginald W.), M.A. THE THIRTEEN COLONIES OF NORTH AMERICA. With 8 Illustrations and a Map. *Demy 8vo.* 7s. 6d. *net.*
A Colonial Edition is also published.

Jeffreys (D. Gwyn). DOLLY'S THEATRICALS. *Super Royal 16mo.* 2s. 6d.

Jenks (E.), M.A., B.C.L. AN OUTLINE OF ENGLISH LOCAL GOVERNMENT. *Second Ed.* Revised by R. C. K. ENSOR, M.A. *Cr. 8vo.* 2s. 6d.

Jenner (Mrs. H.). See Little Books on Art.

Jennings (Oscar), M.D. EARLY WOODCUT INITIALS. *Demy 4to.* 21s. *net.*

Jessopp (Augustus), D.D. See Leaders of Religion.

Jevons (F. B.), M.A., Litt.D., Principal of Hatfield Hall, Durham. RELIGION IN EVOLUTION. *Cr. 8vo.* 3s. 6d. *net.*
See also Churchman's Library and Handbooks of Theology.

Johnson (Mrs. Barham). WILLIAM BODHAM DONNE AND HIS FRIENDS. Illustrated. *Demy 8vo.* 10s. 6d. *net.*

Johnston (Sir H. H.), K.C.B. BRITISH CENTRAL AFRICA. With nearly 200 Illustrations and Six Maps. *Third Edition. Cr. 4to.* 18s. *net.*
A Colonial Edition is also published.

Jones (H.). See Commercial Series.

Jones (H. F.). See Textbooks of Science.

Jones (L. A. Atherley), K.C., M.P., and **Bellot (Hugh H. L.),** M.A., D.C.L. THE MINER'S GUIDE TO THE COAL MINES REGULATION ACTS AND THE LAW OF EMPLOYERS AND WORKMEN. *Cr. 8vo.* 2s. 6d. *net.*
COMMERCE IN WAR. *Royal 8vo.* 21s. *net.*

Jones (R. Compton), M.A. POEMS OF THE INNER LIFE. Selected by. *Thirteenth Edition. Fcap. 8vo.* 2s. 6d. *net.*

Jonson (Ben). See Standard Library.

Juliana (Lady) of Norwich. REVELATIONS OF DIVINE LOVE. Ed. by GRACE WARRACK. *Third Ed. Cr. 8vo.* 3s. 6d.

Juvenal. See Classical Translations.

'Kappa.' LET YOUTH BUT KNOW: A Plea for Reason in Education. *Cr. 8vo.* 3s. 6d. *net.*

Kaufmann (M.), M.A. SOCIALISM AND MODERN THOUGHT. *Second Edition Revised and Enlarged. Cr. 8vo.* 2s. 6d. *net.*

Keats (John). THE POEMS. Edited with Introduction and Notes by E. de SELINCOURT, M.A. With a Frontispiece in Photogravure. *Second Edition Revised. Demy 8vo.* 7s. 6d. *net.*
REALMS OF GOLD. Selections from the Works of. *Fcap. 8vo.* 3s. 6d. *net.*
See also Little Library and Standard Library.

Keble (John). THE CHRISTIAN YEAR. With an Introduction and Notes by W. LOCK, D.D., Warden of Keble College. Illustrated by R. ANNING BELL. *Third Edition. Fcap. 8vo.* 3s. 6d.; *padded morocco,* 5s.
See also Library of Devotion.

Kelynack (T. N.), M.D., M.R.C.P. THE DRINK PROBLEM IN ITS MEDICO-SOCIOLOGICAL ASPECT. By fourteen Medical Authorities. Edited by. With 2 Diagrams. *Demy 8vo.* 7s. 6d. *net.*

Kempis (Thomas à). THE IMITATION OF CHRIST. With an Introduction by DEAN FARRAR. Illustrated by C. M. GERE. *Third Edition. Fcap. 8vo.* 3s. 6d.; *padded morocco.* 5s.
Also Translated by C. BIGG, D.D. *Cr. 8vo.* 3s. 6d.
See also Montmorency (J. E. G. de)., Library of Devotion, and Standard Library.

Kennedy (Bart.). THE GREEN SPHINX. *Cr. 8vo.* 3s. 6d. *net.*

Kennedy (James Houghton), D.D., Assistant Lecturer in Divinity in the University of Dublin. ST. PAUL'S SECOND AND THIRD EPISTLES TO THE CORINTHIANS. With Introduction, Dissertations and Notes. *Cr. 8vo.* 6s.

Kimmins (C. W.), M.A. THE CHEMISTRY OF LIFE AND HEALTH. Illustrated. *Cr. 8vo.* 2s. 6d.

Kinglake (A. W.). See Little Library.

Kipling (Rudyard). BARRACK-ROOM BALLADS. *89th Thousand. Twenty-fifth Edition. Cr. 8vo.* 6s. *Also Leather, Fcap. 8vo.* 5s.
A Colonial Edition is also published.
THE SEVEN SEAS. *77th Thousand. Fourteenth Edition. Cr. 8vo.* 6s. *Also Leather. Fcap. 8vo.* 5s.
A Colonial Edition is also published.
THE FIVE NATIONS. *65th Thousand. Fourth Edition. Cr. 8vo.* 6s. *Also Leather. Fcap. 8vo.* 5s.
A Colonial Edition is also published.
DEPARTMENTAL DITTIES. *Seventeenth Edition. Cr. 8vo.* 6s. *Also Leather. Fcap. 8vo.* 5s.
A Colonial Edition is also published.

Knight (Albert E.). THE COMPLETE CRICKETER. With 50 Illustrations. *Demy 8vo.* 7s. 6d. *net.*
A Colonial Edition is also published.

Knight (H. J. C.), B.D. See Churchman's Bible.

Knowling (R. J.), M.A., Professor of New Testament Exegesis at King's College, London. See Westminster Commentaries.

Lamb (Charles and Mary), THE WORKS. Edited by E. V. LUCAS. Illustrated. *In Seven Volumes. Demy 8vo.* 7s. 6d. *each.*
See also Little Library and Lucas (E. V.)

Lambert (F. A. H.). See Little Guides.

Lambros (Professor S. P.). See Byzantine Texts.

Lane-Poole (Stanley). A HISTORY OF EGYPT IN THE MIDDLE AGES. Fully Illustrated. *Cr. 8vo.* 6s.

Langbridge (F.), M.A. BALLADS OF THE BRAVE: Poems of Chivalry, Enterprise, Courage, and Constancy. *Third Edition. Cr. 8vo.* 2s. 6d.

Law (William). See Library of Devotion and Standard Library.

Leach (Henry). THE DUKE OF DEVONSHIRE. A Biography. With 12 Illustrations. *Demy 8vo.* 12s. 6d. *net.*

THE SPIRIT OF THE LINKS. *Cr. 8vo.* 6s.

A Colonial Edition is also published.

See also Braid (James).

Le Braz (Anatole). THE LAND OF PARDONS. Translated by FRANCES M. GOSTLING. With 12 Illustrations in Colour by T. C. GOTCH, and 40 other Illustrations. *Third Edition. Crown 8vo.* 6s.

Lee (Captain L. Melville). A HISTORY OF POLICE IN ENGLAND. *Cr. 8vo.* 3s. 6d. *net.*

Lewes (V. B.), M.A. AIR AND WATER. Illustrated. *Cr. 8vo.* 2s. 6d.

Lewis (B. M. Gwyn). A CONCISE HANDBOOK OF GARDEN SHRUBS. With 20 Illustrations. *Fcap. 8vo.* 3s. 6d. *net.*

Lisle (Fortunéede). See Little Books on Art.

Littlehales (H.). See Antiquary's Books.

Llewellyn (Owen) and **Raven-Hill (L.).** THE SOUTH-BOUND CAR. With 85 Illustrations. *Crown 8vo.* 6s.

Lock (Walter), D.D., Warden of Keble College. ST. PAUL, THE MASTER-BUILDER. *Second Ed. Cr. 8vo.* 3s. 6d.

THE BIBLE AND CHRISTIAN LIFE. *Cr. 8vo.* 6s.

See also Keble (J.) and Leaders of Religion.

Locker (F.). See Little Library.

Lodge (Sir Oliver), F.R.S. THE SUBSTANCE OF FAITH ALLIED WITH SCIENCE: A Catechism for Parents and Teachers. *Ninth Ed. Cr. 8vo.* 2s. *net.*

Lofthouse (W. F.), M.A. ETHICS AND ATONEMENT. With a Frontispiece. *Demy 8vo.* 5s. *net.*

Longfellow (H. W.). See Little Library.

Lorimer (George Horace). LETTERS FROM A SELF-MADE MERCHANT TO HIS SON. *Seventeenth Edition. Cr. 8vo.* 3s. 6d.

A Colonial Edition is also published.

OLD GORGON GRAHAM. *Second Edition. Cr. 8vo.* 6s.

A Colonial Edition is also published.

Lover (Samuel). See I.P.L.

E. V. L. and **C. L. G.** ENGLAND DAY BY DAY: Or, The Englishman's Handbook to Efficiency. Illustrated by GEORGE MORROW. *Fourth Edition. Fcap. 4to.* 1s. *net.*

Lucas (E. V.). THE LIFE OF CHARLES LAMB. With 28 Illustrations. *Fourth and Revised Edition in One Volume. Demy 8vo.* 7s. 6d. *net.*

A Colonial Edition is also published.

A WANDERER IN HOLLAND. With 20 Illustrations in Colour by HERBERT MARSHALL, 34 Illustrations after old Dutch Masters, and a Map. *Ninth Edition. Cr. 8vo.* 6s.

A Colonial Edition is also published.

A WANDERER IN LONDON. With 16 Illustrations in Colour by NELSON DAWSON, 36 other Illustrations and a Map. *Sixth Edition. Cr. 8vo.* 6s.

A Colonial Edition is also published.

THE OPEN ROAD: a Little Book for Wayfarers. *Fourteenth Edition. Fcap. 8vo.* 5s.; *India Paper,* 7s. 6d.

THE FRIENDLY TOWN: a Little Book for the Urbane. *Fourth Edition. Fcap. 8vo.* 5s.; *India Paper,* 7s. 6d.

FIRESIDE AND SUNSHINE. *Fourth Edition. Fcap. 8vo.* 5s.

CHARACTER AND COMEDY. *Fourth Edition. Fcap. 8vo.* 5s.

THE GENTLEST ART. A Choice of Letters by Entertaining Hands. *Fifth Edition. Fcap. 8vo.* 5s.

A SWAN AND HER FRIENDS. With 24 Illustrations. *Demy 8vo.* 12s. 6d. *net.*

A Colonial Edition is also published.

Lucian. See Classical Translations.

Lyde (L. W.), M.A. See Commercial Series.

Lydon (Noel S.). See Junior School Books.

Lyttelton (Hon. Mrs. A.). WOMEN AND THEIR WORK. *Cr. 8vo.* 2s. 6d.

Macaulay (Lord). CRITICAL AND HISTORICAL ESSAYS. Edited by F. C. MONTAGUE, M.A. *Three Volumes. Cr. 8vo.* 18s.

M'Allen (J. E. B.), M.A. See Commercial Series.

MacCulloch (J. A.). See Churchman's Library.

MacCunn (Florence A.). MARY STUART. With 44 Illustrations, including a Frontispiece in Photogravure. *New and Cheaper Edition. Large Cr. 8vo.* 6s.

See also Leaders of Religion.

McDermott (E. R.). See Books on Business.

M'Dowall (A. S.). See Oxford Biographies.

Mackay (A. M.), B.A. See Churchman's Library.

Mackenzie (W. Leslie), M.A., M.D., D.P.H., etc. THE HEALTH OF THE SCHOOL CHILD. *Cr. 8vo.* 2s. 6d.

Macklin (Herbert W.), M.A. See Antiquary's Books.

M'Neile (A. H.), B.D. See Westminster Commentaries.

'Mdlle Mori' (Author of). ST. CATHERINE OF SIENA AND HER TIMES. With 28 Illustrations. *Second Edition. Demy 8vo.* 7s. 6d. *net.*

Magnus (Laurie), M.A. A PRIMER OF WORDSWORTH. *Cr. 8vo.* 2s. 6d.

Mahaffy (J. P.), Litt.D. A HISTORY OF THE EGYPT OF THE PTOLEMIES. Fully Illustrated. *Cr. 8vo.* 6s.

Maitland (F. W.), M.A., LL.D. ROMAN CANON LAW IN THE CHURCH OF ENGLAND. *Royal 8vo.* 7s. 6d.

Major (H.), B.A., B.Sc. A HEALTH AND TEMPERANCE READER. *Cr. 8vo.* 1s.

Malden (H. E.), M.A. ENGLISH RECORDS. A Companion to the History of England. *Cr. 8vo.* 3s. 6d.

THE RIGHTS AND DUTIES OF A CITIZEN. *Seventh Edition. Cr. 8vo.* 1s. 6d.

See also School Histories.

Marchant (E. C.), M.A., Fellow of Peterhouse, Cambridge. A GREEK ANTHOLOGY *Second Edition. Cr. 8vo.* 3s. 6d.

See also Cook (A. M.).

Marks (Jeannette), M.A. ENGLISH PASTORAL DRAMA from the Restoration to the date of the publication of the 'Lyrical Ballads' (1660-1798). *Cr. 8vo.* 5s. *net.*

Marr (J. E.), F.R.S., Fellow of St John's College, Cambridge. THE SCIENTIFIC STUDY OF SCENERY. *Third Edition.* Illustrated. *Cr. 8vo.* 6s.

AGRICULTURAL GEOLOGY. Illustrated. *Cr. 8vo.* 6s.

Marriott (J. A. R.), M.A. THE LIFE AND TIMES OF LORD FALKLAND. With 23 Illustrations. *Second Edition. Demy 8vo.* 7s. 6d. *net.*

Marvell (Andrew). See Little Library.

Masefield (John). SEA LIFE IN NELSON'S TIME. Illustrated. *Cr. 8vo.* 3s. 6d. *net.*

A Colonial Edition is also published.

ON THE SPANISH MAIN: or, SOME ENGLISH FORAYS IN THE ISTHMUS OF DARIEN. With 22 Illustrations and a Map. *Demy 8vo.* 10s. 6d. *net.*

A Colonial Edition is also published.

A SAILOR'S GARLAND. Selected and Edited by. *Second Ed. Cr. 8vo.* 3s. 6d. *net.*

AN ENGLISH PROSE MISCELLANY. Selected and Edited by. *Cr. 8vo.* 6s.

Maskell (A.). See Connoisseur's Library.

Mason (A. J.), D.D. See Leaders of Religion.

Masterman (C. F. G.), M.A., M.P. TENNYSON AS A RELIGIOUS TEACHER. *Cr. 8vo.* 6s.

Matheson (E. F.). COUNSELS OF LIFE. *Fcap. 8vo.* 2s. 6d. *net.*

May (Phil). THE PHIL MAY ALBUM. *Second Edition. 4to.* 1s. *net.*

Meakin (Annette M. B.), Fellow of the Anthropological Institute. WOMAN IN TRANSITION. *Cr. 8vo.* 6s.

Mellows (Emma S.). A SHORT STORY OF ENGLISH LITERATURE. *Cr. 8vo.* 3s. 6d.

Methuen (A. M. S.), M.A. THE TRAGEDY OF SOUTH AFRICA. *Cr. 8vo.* 2s. *net. Also Cr. 8vo.* 3d. *net.*

ENGLAND'S RUIN: DISCUSSED IN SIXTEEN LETTERS TO A PROTECTIONIST. *Eighth Edition. Cr. 8vo.* 3d. *net.*

Miles (Eustace), M.A. LIFE AFTER LIFE: OR, THE THEORY OF REINCARNATION. *Cr. 8vo.* 2s. 6d. *net.*

THE POWER OF CONCENTRATION: HOW TO ACQUIRE IT. *Second Edition. Cr. 8vo.* 3s. 6d. *net.*

Millais (J. G.). THE LIFE AND LETTERS OF SIR JOHN EVERETT MILLAIS, President of the Royal Academy. With many Illustrations, of which 2 are in Photogravure. *New Edition. Demy 8vo.* 7s. 6d. *net.*

See also Little Galleries.

Millin (G. F.). PICTORIAL GARDENING. With 21 Illustrations. *Crown 8vo.* 3s. 6d. *net.*

Millis (C. T.), M.I.M.E. See Textbooks of Technology.

Milne (J. G.), M.A. A HISTORY OF EGYPT UNDER ROMAN RULE. Fully Illustrated. *Cr. 8vo.* 6s.

Milton (John). See Little Library and Standard Library.

A DAY BOOK OF MILTON. Edited by R. F. TOWNDROW. *Fcap. 8vo.* 2s. 6d. *net.*

Minchin (H. C.), M.A. See Peel (R.).

Mitchell (P. Chalmers), M.A. OUTLINES OF BIOLOGY. Illustrated. *Second Edition. Cr. 8vo.* 6s.

Mitton (G. E.). JANE AUSTEN AND HER TIMES. With 21 Illustrations. *Second and Cheaper Edition Large Cr. 8vo.* 6s.

A Colonial Edition is also published.

Moffat (Mary M.). QUEEN LOUISA OF PRUSSIA. With 20 Illustrations. *Fourth Edition. Crown 8vo.* 6s.

A Colonial Edition is also published.

'Moil (A.).' See Books on Business.

Moir (D. M.). See Little Library.

Molinos (Dr. Michael de). See Library of Devotion.

Money (L. G. Chiozza), M.P. RICHES AND POVERTY. *Eighth Edition. Demy 8vo.* 5s. *net.* Also *Cr. 8vo.* 1s. *net.*

SOCIAL AND INDUSTRIAL PROBLEMS. *Demy 8vo.* 5s. *net.*

Montagu (Henry), Earl of Manchester. See Library of Devotion.

Montaigne. A DAY BOOK OF. Edited by C. F. POND. *Fcap. 8vo.* 2s. 6d. *net.*

Montgomery (H. B.) THE EMPIRE OF THE EAST. With a Frontispiece in Colour and 16 other Illustrations. *Second Edition. Demy 8vo.* 7s. 6d. *net.*

A Colonial Edition is also published.

Montmorency (J. E. G. de), B.A., LL.B. THOMAS À KEMPIS, HIS AGE AND BOOK. With 22 Illustrations. *Second Edition. Demy 8vo.* 7s. 6d. *net.*

Moore (H. E.). BACK TO THE LAND. *Cr. 8vo.* 2s. 6d.

Moorhouse (E. Hallam). NELSON'S LADY HAMILTON. With 51 Portraits. *Second Edition. Demy 8vo.* 7s. 6d. *net.*

A Colonial Edition is also published.

Moran (Clarence G.). See Books on Business.

More (Sir Thomas). See Standard Library.

Morfill (W. R.), Oriel College, Oxford. A HISTORY OF RUSSIA FROM PETER THE GREAT TO ALEXANDER II. With Maps and Plans. *Cr. 8vo.* 3s. 6d.

Morich (R. J.), late of Clifton College. See School Examination Series.

Morley (Margaret W.), Founded on. THE BEE PEOPLE. With 74 Illustrations. *Sq. Crown 8vo.* 2s. 6d.

LITTLE MITCHELL: THE STORY OF A MOUNTAIN SQUIRREL TOLD BY HIMSELF. With many Illustrations. *Sq. Cr. 8vo.* 2s. 6d.

Morris (J.). THE MAKERS OF JAPAN. With 24 Illustrations. *Demy 8vo.* 12s. 6d. *net.*

Morris (Joseph E.). See Little Guides.

Morton (A. Anderson). See Brodrick (M.).

Moule (H. C. G.), D.D., Lord Bishop of Durham. See Leaders of Religion.

Muir (M. M. Pattison), M.A. THE CHEMISTRY OF FIRE. Illustrated. *Cr. 8vo.* 2s. 6d.

Mundella (V. A.), M.A. See Dunn (J. T.).

Munro (R.), M.A., LL.D. See Antiquary's Books.

Myers (A. Wallis), THE COMPLETE LAWN TENNIS PLAYER. With many Illustrations. *Second Edition. Demy 8vo.* 10s. 6d. *net.*

Naval Officer (A). See I. P. L.

Neal (W. G.). See Hall (R. N.).

Newman (Ernest). HUGO WOLF. With 13 Illustrations. *Demy 8vo.* 7s. 6d. *net.*

Newman (George), M.D., D.P.H., F.R.S.E., INFANT MORTALITY, A SOCIAL PROBLEM. With 16 Diagrams. *Demy 8vo.* 7s. 6d. *net.*

Newman (J. H.) and others. See Library of Devotion.

Newsholme (Arthur), M.D., F.R.C.P. THE PREVENTION OF TUBERCULOSIS. *Demy 8vo.* 10s. 6d. *net.*

Nichols (Bowyer). See Little Library.

Nicklin (T.), M.A. EXAMINATION PAPERS IN THUCYDIDES. *Cr. 8vo.* 2s.

Nimrod. See I. P. L.

Norgate (G. Le Grys). THE LIFE OF SIR WALTER SCOTT. With 53 Illustrations by JENNY WYLIE. *Demy 8vo.* 7s. 6d. *net.*

Norway (A. H.). NAPLES. PAST AND PRESENT. With 25 Coloured Illustrations by MAURICE GREIFFENHAGEN. *Third Edition. Cr. 8vo.* 6s.

A Colonial Edition is also published.

Novalis. THE DISCIPLES AT SAÏS AND OTHER FRAGMENTS. Edited by Miss UNA BIRCH. *Fcap. 8vo.* 3s. 6d. *net.*

Officer (An). See I. P. L.

Oldfield (W. J.), M.A., Prebendary of Lincoln. A PRIMER OF RELIGION. BASED ON THE CATECHISM OF THE CHURCH OF ENGLAND. *Crown 8vo.* 2s. 6d.

Oldham (F. M.), B.A. See Textbooks of Science.

Oliphant (Mrs.). See Leaders of Religion.

Oliver, Thomas, M.D. DISEASES OF OCCUPATION. With Illustrations. *Second Edition. Demy 8vo.* 10s. 6d. *net.*

Oman (C. W. C.), M.A., Fellow of All Souls', Oxford. A HISTORY OF THE ART OF WAR IN THE MIDDLE AGES. Illustrated. *Demy 8vo.* 10s. 6d. *net.*

Ottley (R. L.), D.D. See Handbooks of Theology and Leaders of Religion.

Overton (J. H.). See Leaders of Religion.

Owen (Douglas). See Books on Business.

Oxford (M. N.), of Guy's Hospital. A HANDBOOK OF NURSING. *Fourth Edition. Cr. 8vo.* 3s. 6d.

Pakes (W. C. C.). THE SCIENCE OF HYGIENE. Illustrated. *Demy 8vo.* 15s.

Parker (Gilbert), M.P. A LOVER'S DIARY. *Fcap. 8vo.* 5s.

A volume of poems.

Parkes (A. K.). SMALL LESSONS ON GREAT TRUTHS. *Fcap. 8vo.* 1s. 6d.

Parkinson (John). PARADISI IN SOLE PARADISUS TERRESTRIS, OR A GARDEN OF ALL SORTS OF PLEASANT FLOWERS. *Folio.* £3, 3s. *net.*

Parmenter (John). HELIO-TROPES, OR NEW POSIES FOR SUNDIALS. Edited by PERCIVAL LANDON. *Quarto.* 3s. 6d. *net.*

Parmentier (Prof. Leon). See Bidez (J.).

Parsons (Mrs. C.). GARRICK AND HIS CIRCLE. With 36 Illustrations. *Second Edition. Demy 8vo.* 12s. 6d. *net.*

A Colonial Edition is also published.

Pascal. See Library of Devotion.

Paston (George). SOCIAL CARICATURE IN THE EIGHTEENTH CENTURY. With over 200 Illustrations. *Imperial Quarto.* £2, 12s. 6d. *net.*

LADY MARY WORTLEY MONTAGU AND HER TIMES With 24 Illustrations. *Second Edition. Demy 8vo.* 15s. *net.*

See also Little Books on Art and I.P.L.

Paterson (W. R.) (Benjamin Swift). LIFE'S QUESTIONINGS. *Cr. 8vo.* 3s. 6d. *net.*

Patterson (A. H.). NOTES OF AN EAST COAST NATURALIST. Illustrated in Colour by F. SOUTHGATE, R.B.A. *Second Edition. Cr. 8vo.* 6s.

NATURE IN EASTERN NORFOLK. With 12 Illustrations in Colour by FRANK SOUTHGATE, R.B.A. *Second Edition. Cr. 8vo.* 6s.

WILD LIFE ON A NORFOLK ESTUARY. With 40 Illustrations by the Author, and a Prefatory Note by Her Grace the DUCHESS OF BEDFORD. *Demy 8vo.* 10s. 6d. *net.*

Peacock (Netta). See Little Books on Art.

Patterson (J. B.). See Simplified French Texts.

Peake (C. M. A.), F.R.H.S. A CONCISE HANDBOOK OF GARDEN ANNUAL AND BIENNIAL PLANTS. With 24 Illustrations. *Fcap. 8vo.* 3s. 6d. *net.*

Peel (Robert), and **Minchin (H. C.)**, M.A. OXFORD. With 100 Illustrations in Colour. *Cr. 8vo.* 6*s.*
A Colonial Edition is also published.

Peel (Sidney), late Fellow of Trinity College, Oxford, and Secretary to the Royal Commission on the Licensing Laws. PRACTICAL LICENSING REFORM. *Second Edition. Cr. 8vo.* 1*s.* 6*d.*

Petrie (W. M. Flinders), D.C.L., LL.D., Professor of Egyptology at University College. A HISTORY OF EGYPT. Fully Illustrated. *In six volumes. Cr. 8vo.* 6*s. each.*
VOL. I. FROM THE EARLIEST KINGS TO XVITH DYNASTY. *Sixth Edition.*
VOL. II. THE XVIITH AND XVIIITH DYNASTIES. *Fourth Edition.*
VOL. III. XIXTH TO XXXTH DYNASTIES.
VOL. IV. THE EGYPT OF THE PTOLEMIES. J. P. MAHAFFY, Litt.D.
VOL. V. ROMAN EGYPT. J. G. MILNE, M.A.
VOL. VI. EGYPT IN THE MIDDLE AGES. STANLEY LANE-POOLE, M.A.
RELIGION AND CONSCIENCE IN ANCIENT EGYPT. Lectures delivered at University College, London. Illustrated. *Cr. 8vo.* 2*s.* 6*d.*
SYRIA AND EGYPT, FROM THE TELL EL AMARNA TABLETS. *Cr. 8vo.* 2*s.* 6*d.*
EGYPTIAN TALES. Translated from the Papyri. First Series, IVth to XIIth Dynasty. Edited by W. M. FLINDERS PETRIE. Illustrated by TRISTRAM ELLIS. *Second Edition. Cr. 8vo.* 3*s.* 6*d.*
EGYPTIAN TALES. Translated from the Papyri. Second Series. XVIIIth to XIXth Dynasty. Illustrated by TRISTRAM ELLIS. *Crown 8vo.* 3*s.* 6*d.*
EGYPTIAN DECORATIVE ART. A Course of Lectures delivered at the Royal Institution. Illustrated. *Cr. 8vo.* 3*s.* 6*d.*

Phillips (W. A.). See Oxford Biographies.

Phillpotts (Eden). MY DEVON YEAR. With 38 Illustrations by J. LEY PETHYBRIDGE. *Second and Cheaper Edition. Large Cr. 8vo.* 6*s.*
UP ALONG AND DOWN ALONG. Illustrated by CLAUDE SHEPPERSON. *Cr. 4to.* 5*s. net.*

Phythian (J. Ernest). TREES IN NATURE, MYTH, AND ART. With 24 Illustrations. *Crown 8vo.* 6*s.*

Plarr (Victor G.). See School Histories.

Plato. See Standard Library.

Plautus. THE CAPTIVI. Edited, with an Introduction, Textual Notes, and a Commentary, by W. M. LINDSAY, Fell of Jesus College, Oxford. *Demy 8vo.* 10*s.* 6*d. net.*

Plowden-Wardlaw (J. T.), B.A., King's College, Cambridge. See School Examination Series.

Podmore (Frank). MODERN SPIRITUALISM. *Two Volumes. Demy 8vo.* 21*s. net.*

Pollard (Alice). See Little Books on Art.

Pollard (Eliza F.). See Little Books on Art.

Pollock (David), M.I.N.A. See Books on Business.

Potter (M. C.), M.A., F.L.S. AN ELEMENTARY TEXT-BOOK OF AGRICULTURAL BOTANY. Illustrated. *Third Edition. Cr. 8vo.* 4*s.* 6*d.*

Power (J. O'Connor). THE MAKING OF AN ORATOR. *Cr. 8vo.* 6*s.*

Prescott (O. L.). ABOUT MUSIC, AND WHAT IT IS MADE OF. *Cr. 8vo.* 3*s.* 6*d. net.*

Price (Eleanor C.). A PRINCESS OF THE OLD WORLD. With 21 Illustrations. *Demy 8vo.* 12*s.* 6*d. net.*

Price (L. L.), M.A., Fellow of Oriel College, Oxon. A HISTORY OF ENGLISH POLITICAL ECONOMY FROM ADAM SMITH TO ARNOLD TOYNBEE. *Fifth Edition. Cr. 8vo.* 2*s.* 6*d.*

Protheroe (Ernest). THE DOMINION OF MAN. GEOGRAPHY IN ITS HUMAN ASPECT. With 32 full-page Illustrations. *Second Edition. Cr. 8vo.* 2*s.*

Quevedo Villegas. See Miniature Library.

'Q' (A. T. Quiller Couch). THE GOLDEN POMP. A PROCESSION OF ENGLISH LYRICS FROM SURREY TO SHIRLEY. *Second and Cheaper Edition. Cr. 8vo.* 2*s.* 6*d. net.*

G. R. and E. S. MR. WOODHOUSE'S CORRESPONDENCE. *Cr. 8vo.* 6*s.*
A Colonial Edition is also published.

Rackham (R. B.), M.A. See Westminster Commentaries.

Ragg (Laura M.). THE WOMEN ARTISTS OF BOLOGNA. With 20 Illustrations. *Demy 8vo.* 7*s.* 6*d. net.*

Ragg (Lonsdale). B.D., Oxon. DANTE AND HIS ITALY. With 32 Illustrations. *Demy 8vo.* 12*s.* 6*d. net.*

Rahtz (F. J.), M.A., B.Sc., Lecturer in English at Merchant Venturers' Technical College, Bristol. HIGHER ENGLISH. *Fourth Edition. Cr. 8vo.* 3*s.* 6*d.*

Randolph (B. W.), D.D. See Library of Devotion.

Rannie (D. W.), M.A. A STUDENT'S HISTORY OF SCOTLAND. *Cr. 8vo.* 3*s.* 6*d.*
WORDSWORTH AND HIS CIRCLE. With 20 Illustrations. *Demy 8vo.* 12*s.* 6*d. net.*

Rashdall (Hastings), M.A., Fellow and Tutor of New College, Oxford. DOCTRINE AND DEVELOPMENT. *Cr. 8vo.* 6*s.*

Raven (J. J.), D.D., F.S.A. See Antiquary's Books.

Raven-Hill (L.). See Llewellyn (Owen).

Rawstorne (Lawrence, Esq.). See I.P.L.

Raymond (Walter). See School Histories.

***Rea (Lilian)**. MADAME DE LA FAYETTE. With many Illustrations. *Demy 8vo.* 10*s.* 6*d. net.*

Real Paddy (A). See I.P.L.

Reason (W.), M.A. UNIVERSITY AND SOCIAL SETTLEMENTS. Edited by. *Cr. 8vo.* 2*s.* 6*d.*

Redpath (H. A.), M.A., D.Litt. See Westminster Commentaries.

Rees (J. D.), C.I.E., M.P. THE REAL INDIA. *Second Edition. Demy 8vo.* 10s. 6d. *net.*
A Colonial Edition is also published.

***Reich (Emil),** Doctor Juris. WOMAN THROUGH THE AGES. With 24 Illustrations. *Two Volumes. Demy 8vo.* 21s. *net.*
A Colonial Edition is also published.

Reynolds (Sir Joshua). See Little Galleries.

Rhoades (J. F.). See Simplified French Texts.

Rhodes (W. E.). See School Histories.

Rieu (H.), M.A. See Simplified French Texts.

Roberts (M. E.). See Channer (C. C.).

Robertson (A.), D.D., Lord Bishop of Exeter. REGNUM DEI. (The Bampton Lectures of 1901). *A New and Cheaper Edition. Demy 8vo.* 7s. 6d. *net.*

Robertson (C. Grant). M.A., Fellow of All Souls' College, Oxford. SELECT STATUTES, CASES, AND CONSTITUTIONAL DOCUMENTS, 1660-1832. *Demy 8vo.* 10s. 6d. *net.*

Robertson (C. Grant) and **Bartholomew (J. G.),** F.R.S.E., F.R.G.S. A HISTORICAL AND MODERN ATLAS OF THE BRITISH EMPIRE. *Demy Quarto.* 4s. 6d. *net.*

Robinson (A. W.), M.A. See Churchman's Bible.

Robinson (Cecilia). THE MINISTRY OF DEACONESSES. With an Introduction by the late Archbishop of Canterbury. *Cr. 8vo.* 3s. 6d.

Robinson (F. S.). See Connoisseur's Library.

Rochefoucauld (La). See Little Library.

Rodwell (G.), B.A. NEW TESTAMENT GREEK. A Course for Beginners. With a Preface by WALTER LOCK, D.D., Warden of Keble College. *Fcap. 8vo.* 3s. 6d.

Roe (Fred). OLD OAK FURNITURE. With many Illustrations by the Author, including a frontispiece in colour. *Second Edition. Demy 8vo.* 10s. 6d. *net.*

Rogers (A. G. L.), M.A. See Books on Business.

Romney (George). See Little Galleries.

Roscoe (E. S.). See Little Guides.

Rose (Edward). THE ROSE READER. Illustrated. *Cr. 8vo.* 2s. 6d. *Also in 4 Parts. Parts I. and II.* 6d. *each; Part III.* 8d.; *Part IV.* 10d.

Rose (G. H.). See Hey (H.)., and **Baring-Gould (S).**

Rowntree (Joshua). THE IMPERIAL DRUG TRADE. A RE-STATEMENT OF THE OPIUM QUESTION. *Third Edition Revised. Cr. 8vo.* 2s. *net.*

Royde-Smith (N. G.). THE PILLOW BOOK: A GARNER OF MANY MOODS. Collected by. *Second Edition. Cr. 8vo.* 4s. 6d. *net.*

POETS OF OUR DAY. Selected, with an Introduction, by. *Fcap. 8vo.* 5s.

Rubie (A. E.), D.D. See Junior School Books.

Russell (Archibald G. B.). See Blake (William).

Russell (W. Clark). THE LIFE OF ADMIRAL LORD COLLINGWOOD. With Illustrations by F. BRANGWYN. *Fourth Edition. Cr. 8vo.* 6s.

Ryley (M. Beresford). QUEENS OF THE RENAISSANCE. With 24 Illustrations. *Demy 8vo.* 10s. 6d. *net.*

Sainsbury (Harrington), M.D., F.R.C.P. PRINCIPIA THERAPEUTICA. *Demy 8vo.* 7s. 6d. *net.*

St. Anselm. See Library of Devotion.

St. Augustine. See Library of Devotion.

St. Bernard. See Library of Devotion.

St. Cyres (Viscount). See Oxford Biographies.

St. Francis of Assisi. THE LITTLE FLOWERS OF THE GLORIOUS MESSER, AND OF HIS FRIARS. Done into English, with Notes by WILLIAM HEYWOOD. With 40 Illustrations from Italian Painters. *Demy 8vo.* 5s. *net.*
See also Wheldon (F. W.), Library of Devotion and Standard Library.

St. Francis de Sales. See Library of Devotion.

'Saki' (H. Munro). REGINALD. *Second Edition. Fcap. 8vo.* 2s. 6d. *net.*

Salmon (A. L.). See Little Guides.

Sathas (C.). See Byzantine Texts.

Schmitt (John). See Byzantine Texts.

Schofield (A. T.), M.D., Hon. Phys. Freidenham Hospital. FUNCTIONAL NERVE DISEASES. *Demy 8vo.* 7s. 6d. *net.*

Scudamore (Cyril). See Little Guides.

Sélincourt (E. de.) See Keats (John).

Sells (V. P.), M.A. THE MECHANICS OF DAILY LIFE. Illustrated. *Cr. 8vo.* 2s. 6d.

Selous (Edmund). TOMMY SMITH'S ANIMALS. Illustrated by G. W. ORD. *Tenth Edition. Fcap. 8vo.* 2s. 6d.
School Edition, 1s. 6d.

TOMMY SMITH'S OTHER ANIMALS. Illustrated by AUGUSTA GUEST. *Fourth Edition. Fcap. 8vo.* 2s 6d.
School Edition, 1s. 6d.

Senter (George), B.Sc. (Lond.), Ph.D. See Textbooks of Science.

Shakespeare (William).

THE FOUR FOLIOS, 1623; 1632; 1664; 1685. Each £4, 4s. *net,* or a complete set, £12, 12s. *net.*
Folios 3 and 4 are ready.
Folio 2 is nearly ready.

THE POEMS OF WILLIAM SHAKESPEARE. With an Introduction and Notes by GEORGE WYNDHAM. *Demy 8vo. Buckram, gilt top,* 10s. 6d.
See also Arden Shakespeare, Standard Library and Little Quarto Shakespeare.

Sharp (A.). VICTORIAN POETS. *Cr. 8vo.* 2s. 6d.
Sharp (Cecil). See Baring-Gould (S.).
Sharp (Elizabeth). See Little Books on Art.
Shedlock (J. S.) THE PIANOFORTE SONATA. *Cr. 8vo.* 5s.
Shelley (Percy B.). See Standard Library.
Sheppard (H. F.), M.A. See Baring-Gould (S.).
Sherwell (Arthur), M.A. LIFE IN WEST LONDON. *Third Edition. Cr. 8vo.* 2s. 6d.
Shipley (Mary E.). AN ENGLISH CHURCH HISTORY FOR CHILDREN. With a Preface by the Bishop of Gibraltar. With Maps and Illustrations. Part I. *Cr. 8vo.* 2s. 6d. *net.*
Sichel (Walter). See Oxford Biographies.
Sidgwick (Mrs. Alfred). HOME LIFE IN GERMANY. With 16 Illustrations. *Second Edition. Demy 8vo.* 10s. 6d. *net.*
A Colonial Edition is also published.
Sime (John). See Little Books on Art.
Simonson (G. A.). FRANCESCO GUARDI. With 41 Plates. *Imperial 4to.* £2, 2s. *net.*
Sketchley (R. E. D.). See Little Books on Art.
Skipton (H. P. K.). See Little Books on Art.
Sladen (Douglas). SICILY: The New Winter Resort. With over 200 Illustrations. *Second Edition. Cr. 8vo.* 5s. *net.*
Small (Evan), M.A. THE EARTH. An Introduction to Physiography. Illustrated. *Cr. 8vo.* 2s. 6d.
Smallwood (M. G.). See Little Books on Art.
Smedley (F. E.). See I.P.L.
Smith (Adam). THE WEALTH OF NATIONS. Edited with an Introduction and numerous Notes by EDWIN CANNAN, M.A. *Two volumes. Demy 8vo.* 21s. *net.*
Smith (H. Clifford). See Connoisseur's Library.
Smith (Horace and James). See Little Library.
Smith (H. Bompas), M.A. A NEW JUNIOR ARITHMETIC. *Crown 8vo.* Without Answers, 2s. With Answers, 2s. 6d.
Smith (R. Mudie). THOUGHTS FOR THE DAY. Edited by. *Fcap. 8vo.* 3s. 6d. *net.*
Smith (Nowell C.). See Wordsworth (W).
Smith (John Thomas). A BOOK FOR A RAINY DAY: Or, Recollections of the Events of the Years 1766-1833. Edited by WILFRED WHITTEN. Illustrated. *Wide Demy 8vo.* 12s. 6d. *net.*
Snell (F. J.). A BOOK OF EXMOOR. Illustrated. *Cr. 8vo.* 6s.
Snowden (C. E.). A HANDY DIGEST OF BRITISH HISTORY. *Demy 8vo.* 4s. 6d.
Sophocles. See Classical Translations.
Sornet (L. A.), and **Acatos (M. J.)** See Junior School Books.
South (E. Wilton), M.A. See Junior School Books.
Southey (R.). ENGLISH SEAMEN Edited by DAVID HANNAY.
Vol. I. (Howard, Clifford, Hawkins, Drake, Cavendish). *Second Edition. Cr. 8vo.* 6s.
Vol. II. (Richard Hawkins, Grenville, Essex, and Raleigh). *Cr. 8vo.* 6s.
See also Standard Library.
Spence (C. H.), M.A. See School Examination Series.
Spicer (A. Dykes), M.A. THE PAPER TRADE. A Descriptive and Historical Survey. With Diagrams and Plans. *Demy 8vo.* 12s. 6d. *net.*
Spooner (W. A.), M.A. See Leaders of Religion.
Spragge (W. Horton), M.A. See Junior School Books.
Staley (Edgcumbe). THE GUILDS OF FLORENCE. Illustrated. *Second Edition. Royal 8vo.* 16s. *net.*
Stanbridge (J. W.), B.D. See Library of Devotion.
'Stancliffe.' GOLF DO'S AND DONT'S. *Second Edition. Fcap. 8vo.* 1s.
Stead (D. W.). See Gallaher (D.).
Stedman (A. M. M.), M.A.
INITIA LATINA: Easy Lessons on Elementary Accidence. *Eleventh Edition. Fcap. 8vo.* 1s.
FIRST LATIN LESSONS. *Eleventh Edition. Cr. 8vo.* 2s.
FIRST LATIN READER. With Notes adapted to the Shorter Latin Primer and Vocabulary. *Seventh Edition. 18mo.* 1s. 6d.
EASY SELECTIONS FROM CÆSAR. The Helvetian War. *Fourth Edition. 18mo.* 1s.
EASY SELECTIONS FROM LIVY. The Kings of Rome. *Second Edition. 18mo.* 1s. 6d.
EASY LATIN PASSAGES FOR UNSEEN TRANSLATION. *Twelfth Ed. Fcap. 8vo.* 1s. 6d.
EXEMPLA LATINA. First Exercises in Latin Accidence. With Vocabulary. *Fourth Edition. Cr. 8vo.* 1s.
EASY LATIN EXERCISES ON THE SYNTAX OF THE SHORTER AND REVISED LATIN PRIMER. With Vocabulary. *Twelfth and Cheaper Edition. Cr. 8vo.* 1s. 6d. KEY, 3s. *net.*
THE LATIN COMPOUND SENTENCE: Rules and Exercises. *Second Edition. Cr. 8vo.* 1s. 6d. With Vocabulary. 2s.
NOTANDA QUAEDAM: Miscellaneous Latin Exercises on Common Rules and Idioms. *Fifth Edition. Fcap. 8vo.* 1s. 6d. With Vocabulary. 2s. KEY, 2s. *net.*
LATIN VOCABULARIES FOR REPETITION: Arranged according to Subjects. *Sixteenth Edition. Fcap. 8vo.* 1s. 6d.
A VOCABULARY OF LATIN IDIOMS. *18mo. Fourth Edition.* 1s.
STEPS TO GREEK. *Third Edition, revised. 18mo.* 1s.

A SHORTER GREEK PRIMER. *Third Edition. Cr. 8vo.* 1*s.* 6*d.*
EASY GREEK PASSAGES FOR UNSEEN TRANSLATION. *Fourth Edition, revised. Fcap. 8vo.* 1*s.* 6*d.*
GREEK VOCABULARIES FOR REPETITION. Arranged according to Subjects. *Fourth Edition. Fcap. 8vo.* 1*s* 6*d.*
GREEK TESTAMENT SELECTIONS. For the use of Schools. With Introduction, Notes, and Vocabulary. *Fourth Edition. Fcap. 8vo.* 2*s.* 6*d.*
STEPS TO FRENCH. *Eighth Edition. 18mo.* 8*d.*
FIRST FRENCH LESSONS. *Ninth Edition. Cr. 8vo.* 1*s.*
EASY FRENCH PASSAGES FOR UNSEEN TRANSLATION. *Sixth Edition. Fcap. 8vo.* 1*s.* 6*d.*
EASY FRENCH EXERCISES ON ELEMENTARY SYNTAX. With Vocabulary. *Fourth Edition. Cr. 8vo.* 2*s.* 6*d.* KEY. 3*s. net.*
FRENCH VOCABULARIES FOR REPETITION: Arranged according to Subjects. *Thirteenth Edition. Fcap. 8vo.* 1*s.*
See also School Examination Series.

Steel (R. Elliott), M.A., F.C.S. THE WORLD OF SCIENCE. With 147 Illustrations. *Second Edition. Cr. 8vo.* 2*s.* 6*d.*
See also School Examination Series.

Stephenson (C.), of the Technical College, Bradford, and **Suddards (F.)** of the Yorkshire College, Leeds. A TEXTBOOK DEALING WITH ORNAMENTAL DESIGN FOR WOVEN FABRICS. With 66 full-page Plates and numerous Diagrams in the Text. *Third Edition. Demy 8vo.* 7*s.* 6*d.*

Stephenson (J.), M.A. THE CHIEF TRUTHS OF THE CHRISTIAN FAITH. *Cr. 8vo.* 3*s.* 6*d.*

Sterne (Laurence). See Little Library.

Steuart (Katherine). BY ALLAN WATER. *Second Edition. Cr. 8vo.* 6*s.*
RICHARD KENNOWAY AND HIS FRIENDS. A Sequel to 'By Allan Water.' *Demy 8vo.* 7*s.* 6*d. net.*

Stevenson (R. L.) THE LETTERS OF ROBERT LOUIS STEVENSON TO HIS FAMILY AND FRIENDS. Selected and Edited by SIDNEY COLVIN. *Eighth Edition. 2 vols. Cr. 8vo.* 12*s.*
LIBRARY EDITION. *2 vols. Demy 8vo.* 25*s. net.*
A Colonial Edition is also published.
VAILIMA LETTERS. With an Etched Portrait by WILLIAM STRANG. *Seventh Edition. Cr. 8vo. Buckram.* 6*s.*
A Colonial Edition is also published.
THE LIFE OF R. L. STEVENSON. See Balfour (G.).

Stevenson (M. I.). FROM SARANAC TO THE MARQUESAS. Being Letters written by Mrs. M. I. STEVENSON during 1887-8. *Cr. 8vo.* 6*s. net.*
A Colonial Edition is also published.
LETTERS FROM SAMOA, 1891-95. Edited and arranged by M. C. BALFOUR. With many Illustrations. *Second Edition Cr. 8vo.* 6*s. net.*
A Colonial Edition is also published.

Stoddart (Anna M.). See Oxford Biographies.

Stokes (F. G.), B.A. HOURS WITH RABELAIS. From the translation of SIR T. URQUHART and P. A. MOTTEUX. With a Portrait in Photogravure. *Cr. 8vo.* 3*s.* 6*d. net.*

Stone (S. J.). POEMS AND HYMNS. With a Memoir by F. G. ELLERTON, M.A. With Portrait. *Cr. 8vo.* 6*s.*

Storr (Vernon F.), M.A., Canon of Winchester. DEVELOPMENT AND DIVINE PURPOSE *Cr. 8vo.* 5*s. net.*

Story (Alfred T.). AMERICAN SHRINES IN ENGLAND. With many Illustrations, including two in Colour by A. R. QUINTON. *Crown 8vo.* 6*s.*
See also Little Guides.

Straker (F.). See Books on Business.

Streane (A. W.), D.D. See Churchman's Bible.

Streatfeild (R. A.). MODERN MUSIC AND MUSICIANS. With 24 Illustrations. *Second Ed. Demy 8vo.* 7*s.* 6*d. net.*

Stroud (Henry), D.Sc., M.A. ELEMENTARY PRACTICAL PHYSICS. With 115 Diagrams. *Second Edit., revised.* 4*s.* 6*d.*

Sturch (F.), Staff Instructor to the Surrey County Council. MANUAL TRAINING DRAWING (WOODWORK). With Solutions to Examination Questions, Orthographic, Isometric and Oblique Projection. With 50 Plates and 140 Figures. *Foolscap.* 5*s. net.*

Suddards (F.). See Stephenson (C.).

Surtees (R. S.). See I.P.L.

Sutherland (William). OLD AGE PENSIONS IN THEORY AND PRACTICE, WITH SOME FOREIGN EXAMPLES. *Cr. 8vo.* 3*s.* 6*d. net.*

Symes (J. E.), M.A. THE FRENCH REVOLUTION. *Second Edition. Cr. 8vo.* 2*s.* 6*d.*

Sympson (E. Mansel), M.A., M.D. See Ancient Cities.

Tabor (Margaret E.). THE SAINTS IN ART. With 20 Illustrations. *Fcap. 8vo.* 3*s.* 6*d. net.*

Tacitus. AGRICOLA. Edited by R. F. DAVIS, M.A. *Fcap. 8vo.* 2*s.*
GERMANIA. By the same Editor. *Fcap. 8vo.* 2*s.*
See also Classical Translations.

Tallack (W.). HOWARD LETTERS AND MEMORIES. *Demy 8vo.* 10*s.* 6*d. net.*

Tatham (Frederick). See Blake (William).

Tauler (J.). See Library of Devotion.

Taylor (A. E.). THE ELEMENTS OF METAPHYSICS. *Second Edition. Demy 8vo.* 10*s.* 6*d. net.*

Taylor (F. G.), M.A. See Commercial Series.

Taylor (I. A.). See Oxford Biographies.

Taylor (John W.). THE COMING OF THE SAINTS. With 26 Illustrations. *Demy 8vo.* 7*s.* 6*d. net.*

Taylor (T. M.), M.A., Fellow of Gonville and Caius College, Cambridge. A CONSTITUTIONAL AND POLITICAL HISTORY OF ROME. To the Reign of Domitian. *Cr. 8vo.* 7*s.* 6*d.*

Teasdale-Buckell (G. T.). THE COMPLETE SHOT. With 53 Illustrations. *Third Edition. Demy 8vo.* 12*s.* 6*d. net.*
A Colonial Edition is also published.

Tennyson (Alfred, Lord). EARLY POEMS. Edited, with Notes and an Introduction, by J. CHURTON COLLINS, M.A. *Cr. 8vo.* 6*s.*
IN MEMORIAM, MAUD, AND THE PRINCESS. Edited by J. CHURTON COLLINS, M.A. *Cr. 8vo.* 6*s.*
See also Little Library.

Terry (C. S.). See Oxford Biographies.

Thackeray (W. M.). See Little Library.

Theobald (F. V.), M.A. INSECT LIFE. Illustrated. *Second Edition Revised. Cr. 8vo.* 2*s.* 6*d.*

Thibaudeau (A. C.). BONAPARTE AND THE CONSULATE. Translated and Edited by G. K. FORTESQUE, LL.D. With 12 Illustrations. *Demy 8vo.* 10*s.* 6*d. net.*

Thompson (A. H.). See Little Guides.

Thompson (A. P.). See Textbooks of Technology.

Tileston (Mary W.). DAILY STRENGTH FOR DAILY NEEDS. *Fifteenth Edition. Medium 16mo.* 2*s.* 6*d. net.* Also an edition in superior binding, 6*s.*

Tompkins (H. W.), F.R.H.S. See Little Books on Art and Little Guides.

Toynbee (Paget), M.A., D.Litt. IN THE FOOTPRINTS OF DANTE. A Treasury of Verse and Prose from the works of Dante. *Small Cr. 8vo.* 4*s.* 6*d. net.*
See also Oxford Biographies and Dante.

Trench (Herbert). DEIRDRE WEDDED AND OTHER POEMS. *Second and Revised Edition. Large Post 8vo.* 6*s.*
NEW POEMS. *Second Edition. Large Post 8vo.* 6*s.*

Trevelyan (G. M.), Fellow of Trinity College, Cambridge. ENGLAND UNDER THE STUARTS. With Maps and Plans. *Third Edition. Demy 8vo.* 10*s.* 6*d. net.*

Troutbeck (G. E.). See Little Guides.

Tyler (E. A.), B.A., F.C.S. See Junior School Books.

Tyrrell-Gill (Frances). See Little Books on Art.

Vardon (Harry). THE COMPLETE GOLFER. With 63 Illustrations. *Ninth Edition. Demy 8vo.* 10*s.* 6*d. net.*
A Colonial Edition is also published.

Vaughan (Henry). See Little Library.

Vaughan (Herbert M.), B.A. (Oxon.). THE LAST OF THE ROYAL STUARTS, HENRY STUART, CARDINAL, DUKE OF YORK. With 20 Illustrations. *Second Edition. Demy 8vo.* 10*s.* 6*d. net.*
THE NAPLES RIVIERA. With 25 Illustrations in Colour by MAURICE GREIFFENHAGEN. *Second Edition. Cr. 8vo.* 6*s.*

Vernon (Hon. W. Warren), M.A. READINGS ON THE INFERNO OF DANTE. With an Introduction by the Rev. Dr. MOORE. *In Two Volumes. Second Edition. Cr. 8vo.* 15*s. net.*
READINGS ON THE PURGATORIO OF DANTE. With an Introduction by the late DEAN CHURCH. *In Two Volumes. Third Edition. Cr. 8vo.* 15*s. net.*

Vincent (J. E.). THROUGH EAST ANGLIA IN A MOTOR CAR. With 16 Illustrations in Colour by FRANK SOUTHGATE, R.B.A., and a Map. *Cr. 8vo.* 6*s.*

Voegelin (A.), M.A. See Junior Examination Series.

Waddell (Col. L. A.), LL.D., C.B. LHASA AND ITS MYSTERIES. With a Record of the Expedition of 1903-1904. With 155 Illustrations and Maps. *Third and Cheaper Edition. Medium 8vo.* 7*s.* 6*d. net.*

Wade (G. W.), D.D. OLD TESTAMENT HISTORY. With Maps. *Fifth Edition. Cr. 8vo.* 6*s.*

Wade (G. W.), D.D., **and Wade (J. H.),** M.A. See Little Guides.

Wagner (Richard). RICHARD WAGNER'S MUSIC DRAMAS: Interpretations, embodying Wagner's own explanations. By ALICE LEIGHTON CLEATHER and BASIL CRUMP. *In Three Volumes. Fcap 8vo.* 2*s.* 6*d. each.*
VOL. I.—THE RING OF THE NIBELUNG. *Third Edition.*
VOL. II.—PARSIFAL, LOHENGRIN, and THE HOLY GRAIL.
VOL. III.—TRISTAN AND ISOLDE.

Walkley (A. B.). DRAMA AND LIFE. *Cr. 8vo.* 6*s.*

Wall (J. C.). See Antiquary's Books.

Wallace-Hadrill (F.), Second Master at Herne Bay College. REVISION NOTES ON ENGLISH HISTORY. *Cr. 8vo.* 1*s.*

Walters (H. B.). See Little Books on Art and Classics of Art.

Walton (F. W.). See School Histories.

Walton (Izaak) and Cotton (Charles). See I.P.L.

Walton (Izaak). See Little Library.

Waterhouse (Elizabeth). WITH THE SIMPLE-HEARTED: Little Homilies to Women in Country Places. *Second Edition. Small Pott 8vo.* 2*s. net.*
See also Little Library.

Watt (Francis). See Henderson (T. F.).

Weatherhead (T. C.), M.A. EXAMINATION PAPERS IN HORACE. *Cr. 8vo.* 2*s.*
See also Junior Examination Series.

Webber (F. C.). See Textbooks of Technology.

Weir (Archibald), M.A. AN INTRODUCTION TO THE HISTORY OF MODERN EUROPE. *Cr. 8vo.* 6*s.*

Wells (Sidney H.) See Textbooks of Science.

Wells (J.), M.A., Fellow and Tutor of Wadham College. OXFORD AND OXFORD LIFE. *Third Edition. Cr. 8vo.* 3s. 6d.
A SHORT HISTORY OF ROME. *Ninth Edition.* With 3 Maps. *Cr. 8vo.* 3s. 6d.
See also Little Guides.
Wesley (John). See Library of Devotion.
Wheldon (F. W.). A LITTLE BROTHER TO THE BIRDS. The life-story of St. Francis retold for children. With 15 Illustrations, 7 of which are by A. H. BUCKLAND. *Large Cr. 8vo.* 6s.
Whibley (C.). See Henley (W. E.).
Whibley (L.), M.A., Fellow of Pembroke College, Cambridge. GREEK OLIGARCHIES: THEIR ORGANISATION AND CHARACTER. *Cr. 8vo.* 6s.
Whitaker (G. H.), M.A. See Churchman's Bible.
White (Gilbert). See Standard Library.
Whitfield (E. E.), M.A. See Commercial Series.
Whitehead (A. W.). GASPARD DE COLIGNY, ADMIRAL OF FRANCE. With Illustrations and Plans. *Demy 8vo.* 12s. 6d. *net.*
Whiteley (R. Lloyd), F.I.C., Principal of the Municipal Science School, West Bromwich. AN ELEMENTARY TEXT-BOOK OF INORGANIC CHEMISTRY. *Cr. 8vo.* 2s. 6d.
Whitley (Miss). See Dilke (Lady).
Whitling (Miss L.), late Staff Teacher of the National Training School of Cookery. THE COMPLETE COOK. With 42 Illustrations. *Demy 8vo.* 7s. 6d. *net.*
A Colonial edition is also published.
Whitten (W.). See Smith (John Thomas).
Whyte (A. G.), B.Sc. See Books on Business.
Wilberforce (Wilfrid). See Little Books on Art.
Wilde (Oscar). DE PROFUNDIS. *Twelfth Edition. Cr. 8vo.* 5s. *net.*
A Colonial Edition is also published.
THE WORKS.
A Uniform Edition. Demy 8vo.
12s. 6d. *net each volume.*
THE DUCHESS OF PADUA: A Play.
POEMS.
INTENTIONS and THE SOUL OF MAN.
SALOMÉ. A FLORENTINE TRAGEDY, and VERA; or, THE NIHILISTS.
LADY WINDERMERE'S FAN: A Play about a Good Woman.
A WOMAN OF NO IMPORTANCE: A Play.
AN IDEAL HUSBAND: A Play.
THE IMPORTANCE OF BEING EARNEST: A Trivial Comedy for Serious People.
A HOUSE OF POMEGRANATES, THE HAPPY PRINCE, and OTHER TALES.
LORD ARTHUR SAVILE'S CRIME and OTHER PROSE PIECES.
DE PROFUNDIS.
Wilkins (W. H.), B.A. THE ALIEN INVASION. *Cr. 8vo.* 2s. 6d.

Williams (A.). PETROL PETER: or Pretty Stories and Funny Pictures. Illustrated in Colour by A. W. MILLS. *Demy 4to.* 3s. 6d. *net.*
Williamson (M. G.)., M.A. See Ancient Cities.
Williamson (W.), B.A. See Junior Examination Series, Junior School Books, and Beginner's Books.
Wilmot-Buxton (E. M.). MAKERS OF EUROPE. Outlines of European History for the Middle Forms of Schools. With 12 Maps. *Tenth Edition. Cr. 8vo.* 3s. 6d.
THE ANCIENT WORLD. With Maps and Illustrations. *Cr. 8vo.* 3s. 6d.
A BOOK OF NOBLE WOMEN. With 16 Illustrations. *Cr. 8vo.* 3s. 6d.
A HISTORY OF GREAT BRITAIN: FROM THE COMING OF THE ANGLES TO THE YEAR 1870. With 20 Maps. *Cr. 8vo.* 3s. 6d.
See also Beginner's Books.
Wilson (Bishop.). See Library of Devotion.
Wilson (A. J.). See Books on Business.
Wilson (H. A.). See Books on Business.
Wilson (J. A.). See Simplified French Texts.
Wilton (Richard), M.A. LYRA PASTORALIS: Songs of Nature, Church, and Home. *Pott 8vo.* 2s. 6d.
Winbolt (S. E.), M.A. EXERCISES IN LATIN ACCIDENCE. *Cr. 8vo.* 1s. 6d.
LATIN HEXAMETER VERSE: An Aid to Composition. *Cr. 8vo.* 3s. 6d. KEY, 5s. *net.*
Windle (B. C. A.), D.Sc., F.R.S., F.S.A. See Antiquary's Books, Little Guides, Ancient Cities, and School Histories.
Wood (Sir Evelyn), F.-M., V.C., G.C.B., G.C.M.G. FROM MIDSHIPMAN TO FIELD-MARSHAL. With Illustrations, and 29 Maps. *Fifth and Cheaper Edition. Demy 8vo.* 7s. 6d. *net.*
A Colonial Edition is also published.
Wood (J. A. E.). See Textbooks of Technology.
Wood (J. Hickory). DAN LENO. Illustrated. *Third Edition. Cr. 8vo.* 6s.
A Colonial Edition is also published.
Wood (W. Birkbeck), M.A., late Scholar of Worcester College, Oxford, and **Edmonds (Major J. E.),** R.E., D.A.Q.-M.G. A HISTORY OF THE CIVIL WAR IN THE UNITED STATES. With an Introduction by H. SPENSER WILKINSON. With 24 Maps and Plans. *Second Edition. Demy 8vo.* 12s. 6d. *net.*
Wordsworth (Christopher), M.A. See Antiquary's Books.
Wordsworth (W.). THE POEMS OF. With an Introduction and Notes by NOWELL C. SMITH, late Fellow of New College, Oxford. *In Three Volumes. Demy 8vo.* 15s. *net.*
POEMS BY WILLIAM WORDSWORTH. Selected with an Introduction by STOPFORD

A. BROOKE. With 40 Illustrations by E. H. NEW, including a Frontispiece in Photogravure. *Cr. 8vo.* 7s. 6d. *net.*
See also Little Library.

Wordsworth (W.) and Coleridge (S. T.). See Little Library.

Wright (Arthur), D.D., Fellow of Queen's College, Cambridge. See Churchman's Library.

Wright (C. Gordon). See Dante.

Wright (J. C.). TO-DAY. Thoughts on Life for every day. *Demy 16mo.* 1s. 6d. *net.*

Wright (Sophie). GERMAN VOCABULARIES FOR REPETITION. *Fcap. 8vo* 1s. 6d.

Wyatt (Kate M.). See Gloag (M. R.).

Wylde (A. B.). MODERN ABYSSINIA. With a Map and a Portrait. *Demy 8vo.* 15s. *net.*

Wyllie (M. A.). NORWAY AND ITS FJORDS. With 16 Illustrations, in Colour by W. L. WYLLIE, R.A., and 17 other Illustrations. *Crown 8vo.* 6s.
A Colonial Edition is also published.

Wyndham (George). See Shakespeare (William).

Yeats (W. B.). A BOOK OF IRISH VERSE. *Revised and Enlarged Edition. Cr. 8vo.* 3s. 6d.

Young (Filson). THE COMPLETE MOTORIST. With 138 Illustrations. *New Edition (Seventh), with many additions. Demy. 8vo.* 12s. 6d. *net.*
A Colonial Edition is also published.

THE JOY OF THE ROAD: An Appreciation of the Motor Car. With a Frontispiece in Photogravure. *Small Demy 8vo.* 5s. *net.*

Zimmern (Antonia). WHAT DO WE KNOW CONCERNING ELECTRICITY? *Fcap. 8vo.* 1s. 6d. *net.*

Ancient Cities

General Editor, B. C. A. WINDLE, D.Sc., F.R.S.

Cr. 8vo. 4s. 6d. *net.*

CHESTER. By B. C. A. Windle, D.Sc. F.R.S. Illustrated by E. H. New.

SHREWSBURY. By T. Auden, M.A., F.S.A. Illustrated by Katharine M. Roberts.

CANTERBURY. By J. C. Cox, LL.D., F.S.A. Illustrated by B. C. Boulter.

EDINBURGH. By M. G. Williamson, M.A. Illustrated by Herbert Railton.

LINCOLN. By E. Mansel Sympson, M.A., M.D. Illustrated by E. H. New.

BRISTOL. By Alfred Harvey, M.B. Illustrated by E. H. New.

DUBLIN. By S. A. O. Fitzpatrick. Illustrated by W. C. Green.

The Antiquary's Books

General Editor, J. CHARLES COX, LL.D., F.S.A.

Demy 8vo. 7s. 6d. *net.*

ENGLISH MONASTIC LIFE. By the Right Rev. Abbot Gasquet, O.S.B. Illustrated. *Third Edition.*

REMAINS OF THE PREHISTORIC AGE IN ENGLAND. By B. C. A. Windle, D.Sc., F.R.S. With numerous Illustrations and Plans.

OLD SERVICE BOOKS OF THE ENGLISH CHURCH. By Christopher Wordsworth, M.A., and Henry Littlehales. With Coloured and other Illustrations.

CELTIC ART IN PAGAN AND CHRISTIAN TIMES. By J. Romilly Allen, F.S.A. With numerous Illustrations and Plans.

ARCHÆOLOGY AND FALSE ANTIQUITIES. By R. Munro, LL.D. Illustrated.

SHRINES OF BRITISH SAINTS. By J. C. Wall. With numerous Illustrations and Plans.

THE ROYAL FORESTS OF ENGLAND. By J. C. Cox, LL.D., F.S.A. Illustrated.

THE MANOR AND MANORIAL RECORDS. By Nathaniel J. Hone. Illustrated.

ENGLISH SEALS. By J. Harvey Bloom. Illustrated.

THE BELLS OF ENGLAND. By Canon J. J. Raven, D.D., F.S.A. With Illustrations. *Second Edition.*

PARISH LIFE IN MEDIÆVAL ENGLAND. By the Right Rev. Abbott Gasquet, O.S.B. With many Illustrations. *Second Edition.*

THE DOMESDAY INQUEST. By Adolphus Ballard, B.A., LL.B. With 27 Illustrations.

THE BRASSES OF ENGLAND. By Herbert W. Macklin, M.A. With many Illustrations. *Second Edition.*

ENGLISH CHURCH FURNITURE. By J. C. Cox, LL.D., F.S.A., and A. Harvey, M.B. *Second Edition.*

FOLK-LORE AS AN HISTORICAL SCIENCE. By G. L. Gomme. With many Illustrations.

*ENGLISH COSTUME. By George Clinch, F.G.S. With many Illustrations.

The Arden Shakespeare

Demy 8vo. 2s. 6d. net each volume.

An edition of Shakespeare in single Plays. Edited with a full Introduction, Textual Notes, and a Commentary at the foot of the page.

HAMLET. Edited by Edward Dowden. *Second Edition.*
ROMEO AND JULIET. Edited by Edward Dowden.
KING LEAR. Edited by W. J. Craig.
JULIUS CAESAR. Edited by M. Macmillan.
THE TEMPEST. Edited by Moreton Luce.
OTHELLO. Edited by H. C. Hart.
TITUS ANDRONICUS. Edited by H. B. Baildon.
CYMBELINE. Edited by Edward Dowden.
THE MERRY WIVES OF WINDSOR. Edited by H. C. Hart.
A MIDSUMMER NIGHT'S DREAM. Edited by H. Cuningham.
KING HENRY V. Edited by H. A. Evans.
ALL'S WELL THAT ENDS WELL. Edited by W.O. Brigstocke.
THE TAMING OF THE SHREW. Edited by R. Warwick Bond.
TIMON OF ATHENS. Edited by K. Deighton.
MEASURE FOR MEASURE. Edited by H. C. Hart.
TWELFTH NIGHT. Edited by Moreton Luce.
THE MERCHANT OF VENICE. Edited by C. Knox Pooler.
TROILUS AND CRESSIDA. Edited by K. Deighton.
THE TWO GENTLEMEN OF VERONA. Edited by R. Warwick Bond.
ANTONY AND CLEOPATRA. Edited by R. H. Case.
LOVE'S LABOUR'S LOST. Edited by H. C. Hart.
PERICLES. Edited by K. Deighton.
KING RICHARD III. Edited by A. H. Thompson.
THE LIFE AND DEATH OF KING JOHN. Edited by Ivor B. John.
THE COMEDY OF ERRORS. Edited by Henry Cuningham.

The Beginner's Books

Edited by W. WILLIAMSON, B.A.

EASY FRENCH RHYMES. By Henri Blouet. *Second Edition.* Illustrated. *Fcap. 8vo.* 1*s.*

EASY STORIES FROM ENGLISH HISTORY. By E. M. Wilmot-Buxton. *Fifth Edition. Cr. 8vo.* 1*s.*

STORIES FROM ROMAN HISTORY. By E. M. Wilmot-Buxton *Cr. 8vo.* 1*s.* 6*d.*

A FIRST HISTORY OF GREECE. By E. E. Firth. *Cr. 8vo.* 1*s.* 6*d.*

EASY EXERCISES IN ARITHMETIC. Arranged by W. S. Beard. *Third Edition. Fcap. 8vo.* Without Answers, 1*s.* With Answers. 1*s.* 3*d.*

EASY DICTATION AND SPELLING. By W. Williamson, B.A. *Seventh Ed. Fcap. 8vo.* 1*s.*

AN EASY POETRY BOOK. Selected and arranged by W. Williamson, B.A. *Second Edition. Cr. 8vo.* 1*s.*

Books on Business

Cr. 8vo. 2s. 6d. net.

PORTS AND DOCKS. By Douglas Owen.
RAILWAYS. By E. R. McDermott.
THE STOCK EXCHANGE. By Chas. Duguid. *Second Edition.*
THE BUSINESS OF INSURANCE. By A. J. Wilson.
THE ELECTRICAL INDUSTRY: LIGHTING, TRACTION, AND POWER. By A. G. Whyte, B.Sc.
THE SHIPBUILDING INDUSTRY: Its History, Practice, Science, and Finance. By David Pollock, M.I.N.A.
THE MONEY MARKET. By F. Straker.
THE BUSINESS SIDE OF AGRICULTURE. By A. G. L. Rogers, M.A.
LAW IN BUSINESS. By H. A. Wilson.
THE BREWING INDUSTRY. By Julian L. Baker, F.I.C., F.C.S. Illustrated.
THE AUTOMOBILE INDUSTRY. By G. de Holden-Stone.
MINING AND MINING INVESTMENTS. By 'A. Moil.'
THE BUSINESS OF ADVERTISING. By Clarence G. Moran, Barrister-at-Law. Illustrated.
TRADE UNIONS. By G. Drage.
CIVIL ENGINEERING. By T. Claxton Fidler, M.Inst. C.E. Illustrated.
THE IRON TRADE OF GREAT BRITAIN. By J. Stephen Jeans. Illustrated.
MONOPOLIES, TRUSTS, AND KARTELLS. By F. W. Hirst.
THE COTTON INDUSTRY AND TRADE. By Prof. S. J. Chapman, Dean of the Faculty of Commerce in the University of Manchester. Illustrated.

Byzantine Texts

Edited by J. B. BURY, M.A., Litt.D.

THE SYRIAC CHRONICLE KNOWN AS THAT OF ZACHARIAH OF MITYLENE. Translated by F. J. Hamilton, D.D., and E. W. Brooks. *Demy 8vo.* *12s. 6d. net.*

EVAGRIUS. Edited by L. Bidez and Léon Parmentier. *Demy 8vo.* *10s. 6d. net.*

THE HISTORY OF PSELLUS. Edited by C. Sathas. *Demy 8vo.* *15s. net.*

ECTHESIS CHRONICA AND CHRONICON ATHENARUM. Edited by Professor S. P. Lambros. *Demy 8vo.* *7s. 6d. net.*

THE CHRONICLE OF MOREA. Edited by John Schmitt. *Demy 8vo.* *15s. net.*

The Churchman's Bible

General Editor, J. H. BURN, B.D., F.R.S.E.

Fcap. 8vo. 1s. *6d. net each.*

THE EPISTLE OF ST. PAUL THE APOSTLE TO THE GALATIANS. Explained by A. W. Robinson, M.A. *Second Edition.*

ECCLESIASTES. Explained by A. W. Streane, D.D.

THE EPISTLE OF ST. PAUL THE APOSTLE TO THE PHILIPPIANS. Explained by C. R. D. Biggs, D.D. *Second Edition.*

THE EPISTLE OF ST. JAMES. Explained by H. W. Fulford M.A.

ISAIAH. Explained by W. E. Barnes, D.D. *Two Volumes.* With Map. *2s. net each.*

THE EPISTLE OF ST. PAUL THE APOSTLE TO THE EPHESIANS. Explained by G. H. Whitaker, M.A.

THE GOSPEL ACCORDING TO ST. MARK. Explained by J. C. Du Buisson, M.A. *2s. 6d. net.*

THE EPISTLE OF PAUL THE APOSTLE TO THE COLOSSIANS AND PHILEMON. Explained by H. J. C. Knight. *2s. net.*

The Churchman's Library

General Editor, J. H. BURN, B.D., F.R.S.E.

Crown 8vo. *3s. 6d. each.*

THE BEGINNINGS OF ENGLISH CHRISTIANITY. By W. E. Collins, M.A. With Map.

THE WORKMANSHIP OF THE PRAYER BOOK: Its Literary and Liturgical Aspects. By J. Dowden, D.D. *Second Edition, Revised and Enlarged.*

EVOLUTION. By F. B. Jevons, M.A., Litt.D.

SOME NEW TESTAMENT PROBLEMS. By Arthur Wright, D.D. *6s.*

THE CHURCHMAN'S INTRODUCTION TO THE OLD TESTAMENT. By A. M. Mackay, B.A. *Second Edition.*

COMPARATIVE THEOLOGY. By J. A. MacCulloch. *6s.*

Classical Translations

Crown 8vo.

ÆSCHYLUS—The Oresteian Trilogy (Agamemnon, Choëphoroe, Eumenides). Translated by Lewis Campbell, LL.D. *5s.*

CICERO—De Oratore I. Translated by E. N. P. Moor, M.A. *Second Edition.* *3s. 6d.*

CICERO—The Speeches against Cataline and Antony and for Murena and Milo. Translated by H. E. D. Blakiston, M.A. *5s.*

CICERO—De Natura Deorum. Translated by F. Brooks, M.A. *3s. 6d.*

CICERO—De Officiis. Translated by G. B. Gardiner, M.A. *2s. 6d.*

HORACE—The Odes and Epodes. Translated by A. D. Godley, M.A. *2s.*

LUCIAN—Six Dialogues Translated by S. T. Irwin, M.A. *3s. 6d.*

SOPHOCLES—Ajax and Electra. Translated by E. D. Morshead, M.A. *2s. 6d.*

TACITUS—Agricola and Germania. Translated by R. B. Townshend. *2s. 6d.*

JUVENAL—Thirteen Satires. Translated by S. G. Owen, M.A. *2s. 6d.*

Classics of Art

Edited by DR. J. H. W. LAING

THE ART OF THE GREEKS. By H. B. Walters. With 112 Plates and 18 Illustrations in the Text. *Wide Royal 8vo.* *12s. 6d. net.*

VELAZQUEZ. By A. de Beruete. With Plates. *Wide Royal 8vo.* *10s. 6d. net.* 94

Commercial Series

Crown 8vo.

BRITISH COMMERCE AND COLONIES FROM ELIZABETH TO VICTORIA. By H. de B. Gibbins, Litt.D., M.A. *Fourth Edition.* 2*s.*

COMMERCIAL EXAMINATION PAPERS. By H. de B. Gibbins, Litt.D., M.A. 1*s.* 6*d.*

THE ECONOMICS OF COMMERCE. By H. de B. Gibbins, Litt.D., M.A. *Second Edition.* 1*s.* 6*d.*

A GERMAN COMMERCIAL READER. By S. E. Bally. With Vocabulary. 2*s.*

A COMMERCIAL GEOGRAPHY OF THE BRITISH EMPIRE. By L. W. Lyde, M.A. *Seventh Edition.* 2*s.*

A COMMERCIAL GEOGRAPHY OF FOREIGN NATIONS. By F. C. Boon, B.A. 2*s.*

A PRIMER OF BUSINESS. By S. Jackson, M.A. *Fourth Edition.* 1*s.* 6*d.*

A SHORT COMMERCIAL ARITHMETIC. By F. G. Taylor, M.A. *Fourth Edition.* 1*s.* 6*d.*

FRENCH COMMERCIAL CORRESPONDENCE. By S. E. Bally. With Vocabulary. *Fourth Edition.* 2*s.*

GERMAN COMMERCIAL CORRESPONDENCE. By S. E. Bally. With Vocabulary. *Second Edition.* 2*s.* 6*d.*

A FRENCH COMMERCIAL READER. By S. E. Bally. With Vocabulary. *Second Edition.* 2*s.*

PRECIS WRITING AND OFFICE CORRESPONDENCE. By E. E. Whitfield, M.A. *Second Edition.* 2*s.*

A ENTRANCE GUIDE TO PROFESSIONS AND BUSINESS. By H. Jones. 1*s.* 6*d.*

THE PRINCIPLES OF BOOK-KEEPING BY DOUBLE ENTRY. By J. E. B. M'Allen, M.A. 2*s.*

COMMERCIAL LAW. By W. Douglas Edwards. *Second Edition.* 2*s.*

The Connoisseur's Library

Wide Royal 8vo. 25*s. net.*

MEZZOTINTS. By Cyril Davenport. With 40 Plates in Photogravure.

PORCELAIN. By Edward Dillon. With 19 Plates in Colour, 20 in Collotype, and 5 in Photogravure.

MINIATURES. By Dudley Heath. With 9 Plates in Colour, 15 in Collotype, and 15 in Photogravure.

IVORIES. By A. Maskell. With 80 Plates in Collotype and Photogravure.

ENGLISH FURNITURE. By F. S. Robinson. With 160 Plates in Collotype and one in Photogravure. *Second Edition.*

ENGLISH COLOURED BOOKS. By Martin Hardie. With 28 Illustrations in Colour and Collotype.

EUROPEAN ENAMELS. By Henry H. Cunynghame, C.B. With 54 Plates in Collotype and Half-tone and 4 Plates in Colour.

GOLDSMITHS' AND SILVERSMITHS' WORK. By Nelson Dawson. With many Plates in Collotype and a Frontispiece in Photogravure. *Second Edition.*

GLASS. By Edward Dillon. With 37 Illustrations in Collotype and 12 in Colour.

SEALS. By Walter de Gray Birch. With 52 Illustrations in Collotype and a Frontispiece in Photogravure.

JEWELLERY. By H. Clifford Smith. With 50 Illustrations in Collotype, and 4 in Colour. *Second Edition.*

The Illustrated Pocket Library of Plain and Coloured Books

Fcap 8vo. 3*s.* 6*d.* *net each volume.*

COLOURED BOOKS

OLD COLOURED BOOKS. By George Paston. With 16 Coloured Plates. *Fcap. 8vo.* 2*s. net.*

THE LIFE AND DEATH OF JOHN MYTTON, ESQ. By Nimrod. With 18 Coloured Plates by Henry Alken and T. J. Rawlins. *Fourth Edition.*

THE LIFE OF A SPORTSMAN. By Nimrod. With 35 Coloured Plates by Henry Alken.

HANDLEY CROSS. By R. S. Surtees. With 17 Coloured Plates and 100 Woodcuts in the Text by John Leech. *Second Edition.*

MR. SPONGE'S SPORTING TOUR. By R. S. Surtees. With 13 Coloured Plates and 90 Woodcuts in the Text by John Leech.

JORROCKS' JAUNTS AND JOLLITIES. By R. S. Surtees. With 15 Coloured Plates by H. Alken. *Second Edition.*

ASK MAMMA. By R. S. Surtees. With 13 Coloured Plates and 70 Woodcuts in the Text by John Leech.

THE ANALYSIS OF THE HUNTING FIELD. By R. S. Surtees. With 7 Coloured Plates by Henry Alken, and 43 Illustrations on Wood.

THE TOUR OF DR. SYNTAX IN SEARCH OF THE PICTURESQUE. By William Combe. With 30 Coloured Plates by T. Rowlandson.

THE TOUR OF DOCTOR SYNTAX IN SEARCH OF CONSOLATION. By William Combe. With 24 Coloured Plates by T. Rowlandson.

THE THIRD TOUR OF DOCTOR SYNTAX IN SEARCH OF A WIFE. By William Combe. With 24 Coloured Plates by T. Rowlandson.

THE HISTORY OF JOHNNY QUAE GENUS: the Little Foundling of the late Dr. Syntax. By the Author of 'The Three Tours.' With 24 Coloured Plates by Rowlandson.

THE ENGLISH DANCE OF DEATH, from the Designs of T. Rowlandson, with Metrical Illustrations by the Author of 'Doctor Syntax.' *Two Volumes.*

This book contains 76 Coloured Plates.

[*Continued.*

ILLUSTRATED POCKET LIBRARY OF PLAIN AND COLOURED BOOKS—*continued.*

THE DANCE OF LIFE: A Poem. By the Author of 'Doctor Syntax.' Illustrated with 26 Coloured Engravings by T. Rowlandson.

LIFE IN LONDON: or, the Day and Night Scenes of Jerry Hawthorn, Esq., and his Elegant Friend, Corinthian Tom. By Pierce Egan. With 36 Coloured Plates by I. R. and G. Cruikshank. With numerous Designs on Wood.

REAL LIFE IN LONDON: or, the Rambles and Adventures of Bob Tallyho, Esq., and his Cousin, The Hon. Tom Dashall. By an Amateur (Pierce Egan). With 31 Coloured Plates by Alken and Rowlandson, etc. *Two Volumes.*

THE LIFE OF AN ACTOR. By Pierce Egan. With 27 Coloured Plates by Theodore Lane, and several Designs on Wood.

THE VICAR OF WAKEFIELD. By Oliver Goldsmith. With 24 Coloured Plates by T. Rowlandson.

THE MILITARY ADVENTURES OF JOHNNY NEWCOMB. By an Officer. With 15 Coloured Plates by T. Rowlandson.

THE NATIONAL SPORTS OF GREAT BRITAIN. With Descriptions and 50 Coloured Plates by Henry Alken.

THE ADVENTURES OF A POST CAPTAIN. By A Naval Officer. With 24 Coloured Plates by Mr. Williams.

GAMONIA: or the Art of Preserving Game; and an Improved Method of making Plantations and Covers, explained and illustrated by Lawrence Rawstorne, Esq. With 15 Coloured Plates by T. Rawlins.

AN ACADEMY FOR GROWN HORSEMEN: Containing the completest Instructions for Walking, Trotting, Cantering, Galloping, Stumbling, and Tumbling. Illustrated with 27 Coloured Plates, and adorned with a Portrait of the Author. By Geoffrey Gambado, Esq.

REAL LIFE IN IRELAND, or, the Day and Night Scenes of Brian Boru, Esq., and his Elegant Friend, Sir Shawn O'Dogherty. By a Real Paddy. With 19 Coloured Plates by Heath, Marks, etc.

THE ADVENTURES OF JOHNNY NEWCOMBE IN THE NAVY. By Alfred Burton. With 16 Coloured Plates by T. Rowlandson.

THE OLD ENGLISH SQUIRE: A Poem. By John Careless, Esq. With 20 Coloured Plates after the style of T. Rowlandson.

THE ENGLISH SPY. By Bernard Blackmantle. An original Work, Characteristic, Satirical, Humorous, comprising scenes and sketches in every Rank of Society, being Portraits of the Illustrious, Eminent, Eccentric, and Notorious. With 72 Coloured Plates by R. CRUIKSHANK, and many Illustrations on wood. *Two Volumes. 7s. net.*

PLAIN BOOKS

THE GRAVE: A Poem. By Robert Blair. Illustrated by 12 Etchings executed by Louis Schiavonetti from the original Inventions of William Blake. With an Engraved Title Page and a Portrait of Blake by T. Phillips, R.A.

The illustrations are reproduced in photogravure.

ILLUSTRATIONS OF THE BOOK OF JOB. Invented and engraved by William Blake.

These famous Illustrations—21 in number—are reproduced in photogravure.

WINDSOR CASTLE. By W. Harrison Ainsworth. With 22 Plates and 87 Woodcuts in the Text by George Cruikshank.

THE TOWER OF LONDON. By W. Harrison Ainsworth. With 40 Plates and 58 Woodcuts in the Text by George Cruikshank.

FRANK FAIRLEGH. By F. E. Smedley. With 30 Plates by George Cruikshank.

HANDY ANDY. By Samuel Lover. With 24 Illustrations by the Author.

THE COMPLEAT ANGLER. By Izaak Walton and Charles Cotton. With 14 Plates and 77 Woodcuts in the Text.

THE PICKWICK PAPERS. By Charles Dickens. With the 43 Illustrations by Seymour and Phiz, the two Buss Plates, and the 32 Contemporary Onwhyn Plates.

Junior Examination Series

Edited by A. M. M. STEDMAN, M.A. *Fcap. 8vo.* 1s.

JUNIOR FRENCH EXAMINATION PAPERS. By F. Jacob, M.A. *Second Edition.*

JUNIOR ENGLISH EXAMINATION PAPERS. By W. Williamson, B.A.

JUNIOR ARITHMETIC EXAMINATION PAPERS. By W. S. Beard. *Fifth Edition.*

JUNIOR ALGEBRA EXAMINATION PAPERS. By S. W Finn, M.A.

JUNIOR GREEK EXAMINATION PAPERS. By T. C. Weatherhead, M.A. KEY, 3s. 6d. *net.*

JUNIOR LATIN EXAMINATION PAPERS. By C. G. Botting, B.A. *Fifth Edition.* KEY, 3s. 6d. *net.*

JUNIOR GENERAL INFORMATION EXAMINATION PAPERS. By W. S. Beard. KEY, 3s. 6d. *net.*

JUNIOR GEOGRAPHY EXAMINATION PAPERS. By W. G. Baker, M.A.

JUNIOR GERMAN EXAMINATION PAPERS. By A. Voegelin, M.A.

Methuen's Junior School-Books

Edited by O. D. INSKIP, LL.D., and W. WILLIAMSON, B.A.

A CLASS-BOOK OF DICTATION PASSAGES. By W. Williamson, B.A. *Fourteenth Edition. Cr. 8vo.* 1*s.* 6*d.*

THE GOSPEL ACCORDING TO ST. MATTHEW. Edited by E. Wilton South, M.A. With Three Maps. *Cr. 8vo.* 1*s.* 6*d.*

THE GOSPEL ACCORDING TO ST. MARK. Edited by A. E. Rubie, D.D. With Three Maps. *Cr. 8vo.* 1*s.* 6*d.*

A JUNIOR ENGLISH GRAMMAR. By W. Williamson, B.A. With numerous passages for parsing and analysis, and a chapter on Essay Writing. *Fourth Edition. Cr. 8vo.* 2*s.*

A JUNIOR CHEMISTRY. By E. A. Tyler, B.A., F.C.S. With 78 Illustrations. *Fourth Edition. Cr. 8vo.* 2*s.* 6*d.*

THE ACTS OF THE APOSTLES. Edited by A. E. Rubie, D.D. *Cr. 8vo.* 2*s.*

A JUNIOR FRENCH GRAMMAR. By L. A. Sornet and M. J. Acatos. *Third Edition. Cr. 8vo.* 2*s.*

ELEMENTARY EXPERIMENTAL SCIENCE. PHYSICS by W. T. Clough, A.R.C.S. CHEMISTRY by A. E. Dunstan, B.Sc. With 2 Plates and 154 Diagrams. *Seventh Edition. Cr. 8vo.* 2*s.* 6*d.*

A JUNIOR GEOMETRY. By Noel S. Lydon. With 276 Diagrams. *Seventh Edition. Cr. 8vo.* 2*s.*

ELEMENTARY EXPERIMENTAL CHEMISTRY. By A. E. Dunstan, B.Sc. With 4 Plates and 109 Diagrams. *Third Edition. Cr. 8vo.* 2*s.*

A JUNIOR FRENCH PROSE. By R. R. N. Baron, M.A. *Third Edition. Cr. 8vo.* 2*s.*

THE GOSPEL ACCORDING TO ST. LUKE. With an Introduction and Notes by William Williamson, B.A. With Three Maps. *Cr. 8vo.* 2*s.*

THE FIRST BOOK OF KINGS. Edited by A. E. RUBIE, D.D. With Maps. *Cr. 8vo.* 2*s.*

A JUNIOR GREEK HISTORY. By W. H. Spragge, M.A. With 4 Illustrations and 5 Maps. *Cr. 8vo.* 2*s.* 6*d.*

A SCHOOL LATIN GRAMMAR. By H. G. Ford, M.A. *Cr. 8vo.* 2*s.* 6*d.*

A JUNIOR LATIN PROSE. By H. N. Asman, M.A., B.D. *Cr. 8vo.* 2*s.* 6*d.*

Leaders of Religion

Edited by H. C. BEECHING, M.A., Canon of Westminster. *With Portraits. Cr. 8vo.* 2*s. net.*

CARDINAL NEWMAN. By R. H. Hutton.
JOHN WESLEY. By J. H. Overton, M.A.
BISHOP WILBERFORCE. By G. W. Daniell, M.A.
CARDINAL MANNING. By A. W. Hutton, M.A.
CHARLES SIMEON. By H. C. G. Moule, D.D.
JOHN KNOX. By F. MacCunn. *Second Edition.*
JOHN HOWE. By R. F. Horton, D.D.
THOMAS KEN. By F. A. Clarke, M.A.
GEORGE FOX, THE QUAKER. By T. Hodgkin, D.C.L. *Third Edition.*
JOHN KEBLE. By Walter Lock, D.D.
THOMAS CHALMERS. By Mrs. Oliphant.
LANCELOT ANDREWES. By R. L. Ottley, D.D. *Second Edition.*
AUGUSTINE OF CANTERBURY. By E. L. Cutts, D.D.
WILLIAM LAUD. By W. H. Hutton, M.A. *Third Edition.*
JOHN DONNE. By Augustus Jessopp, D.D.
THOMAS CRANMER. By A. J. Mason, D.D.
BISHOP LATIMER. By R. M. Carlyle and A. J. Carlyle, M.A.
BISHOP BUTLER. By W. A. Spooner, M.A.

The Library of Devotion

With Introductions and (where necessary) Notes.
Small Pott 8vo, cloth, 2*s.*; *leather,* 2*s.* 6*d. net.*

THE CONFESSIONS OF ST. AUGUSTINE. Edited by C. Bigg, D.D. *Sixth Edition.*

THE IMITATION OF CHRIST: called also the Ecclesiastical Music. Edited by C. Bigg, D.D. *Fifth Edition.*

THE CHRISTIAN YEAR. Edited by Walter Lock, D.D. *Fourth Edition.*

LYRA INNOCENTIUM. Edited by Walter Lock, D.D. *Second Edition.*

THE TEMPLE. Edited by E. C. S. Gibson, D.D. *Second Edition.*

A BOOK OF DEVOTIONS. Edited by J. W. Stanbridge. B.D. *Second Edition.*

A SERIOUS CALL TO A DEVOUT AND HOLY LIFE. Edited by C. Bigg, D.D. *Fourth Ed.*

A GUIDE TO ETERNITY. Edited by J. W. Stanbridge, B.D.

THE INNER WAY. By J. Tauler. Edited by A. W. Hutton, M.A.

ON THE LOVE OF GOD. By St. Francis de Sales. Edited by W. J. Knox-Little, M.A.

THE PSALMS OF DAVID. Edited by B. W. Randolph, D.D.

LYRA APOSTOLICA. By Cardinal Newman and others. Edited by Canon Scott Holland, M.A., and Canon H. C. Beeching, M.A.

THE SONG OF SONGS. Edited by B. Blaxland, M.A.

THE THOUGHTS OF PASCAL. Edited by C. S. Jerram, M.A.

A MANUAL OF CONSOLATION FROM THE SAINTS AND FATHERS. Edited by J. H. Burn, B.D.

[*Continued*

THE LIBRARY OF DEVOTION—*continued.*

THE DEVOTIONS OF ST. ANSELM. Edited by C. C. J. Webb, M.A.

GRACE ABOUNDING TO THE CHIEF OF SINNERS. By John Bunyan. Edited by S. C. Freer, M.A.

BISHOP WILSON'S SACRA PRIVATA. Edited by A. E. Burn, B.D.

LYRA SACRA: A Book of Sacred Verse. Edited by Canon H. C. Beeching, M.A. *Second Edition, revised.*

A DAY BOOK FROM THE SAINTS AND FATHERS. Edited by J. H. Burn, B.D.

A LITTLE BOOK OF HEAVENLY WISDOM. A Selection from the English Mystics. Edited by E. C. Gregory.

LIGHT, LIFE, and LOVE. A Selection from the German Mystics. Edited by W. R. Inge, M.A.

AN INTRODUCTION TO THE DEVOUT LIFE. By St. Francis de Sales. Translated and Edited by T. Barns, M.A.

THE LITTLE FLOWERS OF THE GLORIOUS MESSER ST. FRANCIS AND OF HIS FRIARS. Done into English by W. Heywood. With an Introduction by A. G. Ferrers Howell.

MANCHESTER AL MONDO: a Contemplation of Death and Immortality. By Henry Montagu, Earl of Manchester. With an Introduction by Elizabeth Waterhouse, Editor of 'A Little Book of Life and Death.'

THE SPIRITUAL GUIDE, which Disentangles the Soul and brings it by the Inward Way to the Fruition of Perfect Contemplation, and the Rich Treasure of Internal Peace. Written by Dr. Michael de Molinos, Priest. Translated from the Italian copy, printed at Venice, 1685. Edited with an Introduction by Kathleen Lyttelton. And a Note by Canon Scott Holland.

DEVOTIONS FOR EVERY DAY OF THE WEEK AND THE GREAT FESTIVALS. By John Wesley. Edited, with an Introduction by Canon C. Bodington.

PRECES PRIVATÆ. By Lancelot Andrewes, Bishop of Winchester. Selections from the Translation by Canon F. E. Brightman. Edited, with an Introduction, by A. E. Burn, D.D.

Little Books on Art

With many Illustrations. Demy 16mo. 2s. 6d. net.

Each volume consists of about 200 pages, and contains from 30 to 40 Illustrations, including a Frontispiece in Photogravure.

GREEK ART. H. B. Walters. *Fourth Edition.*
BOOKPLATES. E. Almack.
REYNOLDS. J. Sime. *Second Edition.*
ROMNEY. George Paston.
WATTS. R. E. D. Sketchley.
LEIGHTON. Alice Corkran.
VELASQUEZ. Wilfrid Wilberforce and A. R. Gilbert.
GREUZE AND BOUCHER. Eliza F. Pollard.
VANDYCK. M. G. Smallwood.
TURNER. Frances Tyrrell-Gill.
DÜRER. Jessie Allen.
HOLBEIN. Mrs. G. Fortescue.
BURNE-JONES. Fortunée de Lisle. *Third Edition.*
HOPPNER. H. P. K. Skipton.
REMBRANDT. Mrs. E. A. Sharp.
COROT. Alice Pollard and Ethel Birnstingl.
RAPHAEL. A. R. Dryhurst.
MILLET. Netta Peacock.
ILLUMINATED MSS. J. W. Bradley.
CHRIST IN ART. Mrs. Henry Jenner.
JEWELLERY. Cyril Davenport.
CLAUDE. E. Dillon.
THE ARTS OF JAPAN. E. Dillon. *Second Ed.*
ENAMELS. Mrs. Nelson Dawson.
MINIATURES. C. Davenport.
CONSTABLE. H. W. Tompkins.
OUR LADY IN ART. Mrs. H. L. Jenner.

The Little Galleries

Demy 16mo. 2s. 6d. net.

Each volume contains 20 plates in Photogravure, together with a short outline of the life and work of the master to whom the book is devoted.

A LITTLE GALLERY OF REYNOLDS.
A LITTLE GALLERY OF ROMNEY.
A LITTLE GALLERY OF HOPPNER.
A LITTLE GALLERY OF MILLAIS.
A LITTLE GALLERY OF ENGLISH POETS.

The Little Guides

With many Illustrations by E. H. NEW and other artists, and from photographs.

Small Pott 8vo, cloth, 2s. 6d. net.; leather, 3s. 6d. net.

The main features of these Guides are (1) a handy and charming form; (2) illustrations from photographs and by well-known artists; (3) good plans and maps; (4) an adequate but compact presentation of everything that is interesting in the natural features, history, archæology, and architecture of the town or district treated.

CAMBRIDGE AND ITS COLLEGES. By A. Hamilton Thompson. *Second Edition.*
OXFORD AND ITS COLLEGES. By J. Wells, M.A. *Eighth Edition.*
ST. PAUL'S CATHEDRAL. By George Clinch.
WESTMINSTER ABBEY. By G. E. Troutbeck. *Second Edition.*

THE ENGLISH LAKES. By F. G. Brabant, M.A.
THE MALVERN COUNTRY. By B. C. A. Windle, D.Sc., F.R.S.
SHAKESPEARE'S COUNTRY. By B. C. A. Windle, D.Sc., F.R.S. *Third Edition.*

NORTH WALES. By A. T. Story.
BUCKINGHAMSHIRE. By E. S. Roscoe.
CHESHIRE. By W. M. Gallichan.
CORNWALL. By A. L. Salmon.
DERBYSHIRE. By J. Charles Cox, LL.D., F.S.A.
DEVON. By S. Baring-Gould.
DORSET. By Frank R. Heath. *Second Ed.*
HAMPSHIRE. By J. C. Cox, LL.D., F.S.A.
HERTFORDSHIRE. By H. W. Tompkins, F.R.H.S.
THE ISLE OF WIGHT. By G. Clinch.
KENT. By G. Clinch.
KERRY. By C. P. Crane.
MIDDLESEX. By John B. Firth.
NORFOLK. By W. A. Dutt.
NORTHAMPTONSHIRE. By Wakeling Dry
OXFORDSHIRE. By F. G. Brabant, M.A.
SOMERSET. By G. W. and J. H. Wade.
SUFFOLK. By W. A. Dutt.
SURREY. By F. A. H. Lambert.
SUSSEX. By F. G. Brabant, M.A. *Second Edition.*
THE EAST RIDING OF YORKSHIRE. By J. E. Morris.
THE NORTH RIDING OF YORKSHIRE. By J. E. Morris.

BRITTANY. By S. Baring-Gould.
NORMANDY. By C. Scudamore.
ROME By C. G. Ellaby.
SICILY. By F. Hamilton Jackson.

The Little Library

With Introductions, Notes, and Photogravure Frontispieces.

Small Pott 8vo. Each Volume, cloth, 1s. 6d. net; leather, 2s. 6d. net.

Anon. A LITTLE BOOK OF ENGLISH LYRICS.

Austen (Jane). PRIDE AND PREJUDICE. Edited by E. V. LUCAS. *Two Vols.*

NORTHANGER ABBEY. Edited by E. V. LUCAS.

Bacon (Francis). THE ESSAYS OF LORD BACON. Edited by EDWARD WRIGHT.

Barham (R. H.). THE INGOLDSBY LEGENDS. Edited by J. B. ATLAY. *Two Volumes.*

Barnett (Mrs. P. A.). A LITTLE BOOK OF ENGLISH PROSE. *Second Edition.*

Beckford (William). THE HISTORY OF THE CALIPH VATHEK. Edited by E. DENISON ROSS.

Blake (William). SELECTIONS FROM WILLIAM BLAKE. Edited by M. PERUGINI.

Borrow (George). LAVENGRO. Edited by F. HINDES GROOME. *Two Volumes.*

THE ROMANY RYE. Edited by JOHN SAMPSON.

Browning (Robert). SELECTIONS FROM THE EARLY POEMS OF ROBERT BROWNING. Edited by W. HALL GRIFFIN, M.A.

Canning (George). SELECTIONS FROM THE ANTI-JACOBIN: with GEORGE CANNING's additional Poems. Edited by LLOYD SANDERS.

Cowley (Abraham). THE ESSAYS OF ABRAHAM COWLEY. Edited by H. C. MINCHIN.

Crabbe (George). SELECTIONS FROM GEORGE CRABBE. Edited by A. C. DEANE.

Craik (Mrs.). JOHN HALIFAX, GENTLEMAN. Edited by ANNIE MATHESON. *Two Volumes.*

Crashaw (Richard). THE ENGLISH POEMS OF RICHARD CRASHAW. Edited by EDWARD HUTTON.

Dante (Alighieri). THE INFERNO OF DANTE. Translated by H. F. CARY. Edited by PAGET TOYNBEE, M.A., D.Litt.

THE PURGATORIO OF DANTE. Translated by H. F. CARY. Edited by PAGET TOYNBEE, M.A., D.Litt.

THE PARADISO OF DANTE. Translated by H. F. CARY. Edited by PAGET TOYNBEE, M.A., D.Litt.

Darley (George). SELECTIONS FROM THE POEMS OF GEORGE DARLEY. Edited by R. A. STREATFEILD.

Deane (A. C.). A LITTLE BOOK OF LIGHT VERSE.

Dickens (Charles). CHRISTMAS BOOKS. *Two Volumes.*

Ferrier (Susan). MARRIAGE. Edited by A. GOODRICH-FREER and LORD IDDESLEIGH. *Two Volumes.*

THE INHERITANCE. *Two Volumes.*

Gaskell (Mrs.). CRANFORD. Edited by E. V. LUCAS. *Second Edition.*

Hawthorne (Nathaniel). THE SCARLET LETTER. Edited by PERCY DEARMER.

Henderson (T. F.). A LITTLE BOOK OF SCOTTISH VERSE.

Keats (John). POEMS. With an Introduction by L. BINYON, and Notes by J. MASEFIELD.

Kinglake (A. W.). EOTHEN. With an Introduction and Notes. *Second Edition.*

[*Continued.*

THE LITTLE LIBRARY—*continued.*

Lamb (Charles). ELIA, AND THE LAST ESSAYS OF ELIA. Edited by E. V. LUCAS.

Locker (F.). LONDON LYRICS Edited by A. D. GODLEY, M.A. A reprint of the First Edition.

Longfellow (H. W.). SELECTIONS FROM LONGFELLOW. Edited by L. M. FAITHFULL.

Marvell (Andrew). THE POEMS OF ANDREW MARVELL. Edited by E. WRIGHT.

Milton (John). THE MINOR POEMS OF JOHN MILTON. Edited by H. C. BEECHING, M.A., Canon of Westminster.

Moir (D. M.). MANSIE WAUCH. Edited by T. F. HENDERSON.

Nichols (J. B. B.). A LITTLE BOOK OF ENGLISH SONNETS.

Rochefoucauld (La). THE MAXIMS OF LA ROCHEFOUCAULD. Translated by Dean STANHOPE. Edited by G. H. POWELL.

Smith (Horace and James). REJECTED ADDRESSES. Edited by A. D. GODLEY, M.A.

Sterne (Laurence). A SENTIMENTAL JOURNEY. Edited by H. W. PAUL.

Tennyson (Alfred, Lord). THE EARLY POEMS OF ALFRED, LORD TENNYSON. Edited by J. CHURTON COLLINS, M.A.

IN MEMORIAM. Edited by Canon H. C. BEECHING, M.A.

THE PRINCESS. Edited by ELIZABETH WORDSWORTH.

MAUD. Edited by ELIZABETH WORDSWORTH.

Thackeray (W. M.). VANITY FAIR. Edited by S. GWYNN. *Three Volumes.*

PENDENNIS. Edited by S. GWYNN. *Three Volumes.*

ESMOND. Edited by S. GWYNN.

CHRISTMAS BOOKS. Edited by S. GWYNN.

Vaughan (Henry). THE POEMS OF HENRY VAUGHAN. Edited by EDWARD HUTTON.

Walton (Izaak). THE COMPLEAT ANGLER. Edited by J. BUCHAN.

Waterhouse (Elizabeth). A LITTLE BOOK OF LIFE AND DEATH. Edited by. *Twelfth Edition.*

Wordsworth (W.). SELECTIONS FROM WORDSWORTH. Edited by NOWELL C. SMITH.

Wordsworth (W.) and Coleridge (S. T.). LYRICAL BALLADS. Edited by GEORGE SAMPSON.

The Little Quarto Shakespeare

Edited by W. J. CRAIG. With Introductions and Notes
Pott 16mo. In 40 Volumes. Leather, price 1s. net each volume.
Mahogany Revolving Book Case. 10s. net.

Miniature Library

Reprints in miniature of a few interesting books which have qualities of humanity, devotion, or literary genius.

EUPHRANOR: A Dialogue on Youth. By Edward FitzGerald. From the edition published by W. Pickering in 1851. *Demy 32mo. Leather, 2s. net.*

POLONIUS: or Wise Saws and Modern Instances. By Edward FitzGerald. From the edition published by W. Pickering in 1852. *Demy 32mo. Leather, 2s. net.*

THE RUBÁIYÁT OF OMAR KHAYYÁM. By Edward FitzGerald. From the 1st edition of 1859, *Fourth Edition. Leather, 1s. net.*

THE LIFE OF EDWARD, LORD HERBERT OF CHERBURY. Written by himself. From the edition printed at Strawberry Hill in the year 1764. *Demy 32mo. Leather, 2s. net.*

THE VISIONS OF DOM FRANCISCO QUEVEDO VILLEGAS, Knight of the Order of St. James. Made English by R. L. From the edition printed for H. Herringman, 1668. *Leather. 2s. net.*

POEMS. By Dora Greenwell. From the edition of 1848. *Leather, 2s net*

Oxford Biographies

Fcap. 8vo. Each volume, cloth, 2s. 6d. net; leather, 3s. 6d. net.

DANTE ALIGHIERI. By Paget Toynbee, M.A., D.Litt. With 12 Illustrations. *Third Edition.*

GIROLAMO SAVONAROLA. By E. L. S. Horsburgh, M.A. With 12 Illustrations. *Second Edition.*

JOHN HOWARD. By E. C. S. Gibson, D.D., Bishop of Gloucester. With 12 Illustrations.

ALFRED TENNYSON. By A. C. BENSON, M.A. With 9 Illustrations. *Second Edition.*

SIR WALTER RALEIGH. By I. A. Taylor. With 12 Illustrations.

ERASMUS. By E. F. H. Capey. With 12 Illustrations.

THE YOUNG PRETENDER. By C. S. Terry. With 12 Illustrations.

ROBERT BURNS. By T. F. Henderson. With 12 Illustrations.

CHATHAM. By A. S. M'Dowall. With 12 Illustrations.

FRANCIS OF ASSISI. By Anna M. Stoddart. With 16 Illustrations.

CANNING. By W. Alison Phillips. With 12 Illustrations.

BEACONSFIELD. By Walter Sichel. With 12 Illustrations.

JOHANN WOLFGANG GOETHE. By H. G. Atkins. With 16 Illustrations.

FRANÇOIS FENELON. By Viscount St Cyres. With 12 Illustrations.

School Examination Series

Edited by A. M. M. STEDMAN, M.A. *Cr. 8vo.* 2*s.* 6*d.*

FRENCH EXAMINATION PAPERS. By A. M. M. Stedman, M.A. *Fifteenth Edition.*
KEY. *Sixth Edition.* 6*s. net.*

LATIN EXAMINATION PAPERS. By A. M. M. Stedman, M.A. *Fourteenth Edition.*
KEY. *Sixth Edition.* 6*s. net.*

GREEK EXAMINATION PAPERS. By A. M. M. Stedman, M.A. *Ninth Edition.*
KEY. *Fourth Edition.* 6*s. net.*

GERMAN EXAMINATION PAPERS. By R. J. Morich. *Seventh Edition.*
KEY. *Third Edition.* 6*s. net.*

HISTORY AND GEOGRAPHY EXAMINATION PAPERS. By C. H. Spence, M.A. *Third Edition.*

PHYSICS EXAMINATION PAPERS. By R. E. Steel, M.A., F.C.S.

GENERAL KNOWLEDGE EXAMINATION PAPERS. By A. M. M. Stedman, M.A. *Sixth Edition.*
KEY. *Fourth Edition.* 7*s. net.*

EXAMINATION PAPERS IN ENGLISH HISTORY. By J. Tait Plowden-Wardlaw, B.A.

School Histories

Illustrated. Crown 8vo. 1*s.* 6*d.*

A SCHOOL HISTORY OF WARWICKSHIRE. By B. C. A. Windle, D.Sc., F.R.S.

A SCHOOL HISTORY OF SOMERSET. By Walter Raymond. *Second Edition.*

A SCHOOL HISTORY OF LANCASHIRE. By W. E. Rhodes.

A SCHOOL HISTORY OF SURREY. By H. E. Malden, M.A.

A SCHOOL HISTORY OF MIDDLESEX. By V. Plarr and F. W. Walton.

Methuen's Simplified French Texts

Edited by T. R. N. CROFTS, M.A.

One Shilling each.

L'HISTOIRE D'UNE TULIPE. Adapted by T. R. N. Crofts, M.A. *Second Edition.*

ABDALLAH. Adapted by J. A. Wilson.

LE DOCTEUR MATHÉUS. Adapted by W. P. Fuller.

LA BOUILLIE AU MIEL. Adapted by P. B. Ingham.

JEAN VALJEAN. Adapted by F. W. M. Draper.

LA CHANSON DE ROLAND. Adapted by H. Rieu, M.A. *Second Edition.*

MÉMOIRES DE CADICHON. Adapted by J. F. Rhoades.

L'EQUIPAGE DE LA BELLE-NIVERNAISE. Adapted by T. R. N. Crofts. *Second Ed.*

L'HISTOIRE DE PIERRE ET CAMILLE. Adapted by J. B. Patterson.

Methuen's Standard Library

Cloth, 1*s. net; double volumes,* 1*s.* 6*d. net.* *Paper,* 6*d. net; double volume,* 1*s. net.*

THE MEDITATIONS OF MARCUS AURELIUS. Translated by R. Graves.

SENSE AND SENSIBILITY. Jane Austen.

ESSAYS AND COUNSELS and THE NEW ATLANTIS. Francis Bacon, Lord Verulam.

RELIGIO MEDICI and URN BURIAL. Sir Thomas Browne. The text collated by A. R. Waller.

THE PILGRIM'S PROGRESS. John Bunyan.

REFLECTIONS ON THE FRENCH REVOLUTION. Edmund Burke.

THE POEMS AND SONGS OF ROBERT BURNS. Double Volume.

THE ANALOGY OF RELIGION, NATURAL AND REVEALED. Joseph Butler.

MISCELLANEOUS POEMS. T. CHATTERTON.

TOM JONES. Henry Fielding. Treble Vol.

CRANFORD. Mrs. Gaskell.

THE HISTORY OF THE DECLINE AND FALL OF THE ROMAN EMPIRE. E. Gibbon. Text and Notes revised by J. B. Bury. Seven double volumes.

THE CASE IS ALTERED. EVERY MAN IN HIS HUMOUR. EVERY MAN OUT OF HIS HUMOUR. Ben Jonson.

THE POEMS AND PLAYS OF OLIVER GOLDSMITH.

CYNTHIA'S REVELS. POETASTER. Ben Jonson.

THE POEMS OF JOHN KEATS. Double volume. The Text has been collated by E. de Sélincourt.

ON THE IMITATION OF CHRIST. By Thomas à Kempis. Translation by C. Bigg.

A SERIOUS CALL TO A DEVOUT AND HOLY LIFE. W. Law.

PARADISE LOST. John Milton.

EIKONOKLASTES AND THE TENURE OF KINGS AND MAGISTRATES. John Milton.

UTOPIA AND POEMS. Sir Thomas More.

THE REPUBLIC OF PLATO. Translated by Sydenham and Taylor. Double Volume. Translation revised by W. H. D. Rouse.

THE LITTLE FLOWERS OF ST. FRANCIS. Translated by W. Heywood.

THE WORKS OF WILLIAM SHAKESPEARE. In 10 volumes.

PRINCIPAL POEMS, 1815-1818. Percy Bysshe Shelley. With an Introduction by C. D. Locock.

THE LIFE OF NELSON. Robert Southey.

THE NATURAL HISTORY AND ANTIQUITIES OF SELBORNE. Gilbert White.

Textbooks of Science

Edited by G. F. GOODCHILD, M.A., B.Sc., and G. R. MILLS, M.A.

Fully Illustrated.

PRACTICAL MECHANICS. S. H. Wells. *Fourth Edition. Cr. 8vo.* 3s. 6d.

PRACTICAL CHEMISTRY. Part I. W. French, M.A. *Cr. 8vo Fifth Edition.* 1s. 6d.

PRACTICAL CHEMISTRY. Part II. W. French and T. H. Boardman. *Cr. 8vo.* 1s. 6d.

EXAMPLES IN PHYSICS. By C. E. Jackson, B.A. *Cr. 8vo.* 2s. 6d.

TECHNICAL ARITHMETIC AND GEOMETRY. By C. T. Millis, M.I.M.E. *Cr. 8vo.* 3s. 6d.

PLANT LIFE, Studies in Garden and School. By Horace F. Jones, F.C.S. With 320 Diagrams. *Cr. 8vo.* 3s. 6d.

THE COMPLETE SCHOOL CHEMISTRY. By F. M. Oldham, B.A. With 126 Illustrations. *Second Edition. Cr. 8vo.* 4s. 6d.

ELEMENTARY SCIENCE FOR PUPIL TEACHERS. PHYSICS SECTION. By W. T. Clough, A.R.C.S. (Lond.), F.C.S. CHEMISTRY SECTION. By A. E. Dunstan, B.Sc. (Lond.), F.C.S. With 2 Plates and 10 Diagrams. *Cr. 8vo.* 2s.

EXAMPLES IN ELEMENTARY MECHANICS, Practical, Graphical, and Theoretical. By W. J. Dobbs, M.A. With 51 Diagrams. *Cr. 8vo.* 5s.

OUTLINES OF PHYSICAL CHEMISTRY. By George Senter, B.Sc. (Lond.), Ph.D. With many Diagrams. *Cr. 8vo.* 3s. 6d.

AN ORGANIC CHEMISTRY FOR SCHOOLS AND TECHNICAL INSTITUTES. By A. E. Dunstan, B.Sc. (Lond.), F.C.S. With many Illustrations. *Cr. 8vo.* 2s. 6d.

FIRST YEAR PHYSICS. By C. E. Jackson, M.A. With 51 diagrams. *Cr. 8vo.* 1s. 6d.

Textbooks of Technology

Edited by G. F. GOODCHILD, M.A., B.Sc., and G. R. MILLS, M.A.

Fully Illustrated.

HOW TO MAKE A DRESS. By J. A. E. Wood. *Fourth Edition. Cr. 8vo.* 1s. 6d.

CARPENTRY AND JOINERY. By F. C. Webber. *Fifth Edition. Cr. 8vo.* 3s. 6d.

MILLINERY, THEORETICAL AND PRACTICAL. By Clare Hill. *Fourth Edition. Cr. 8vo.* 2s.

INSTRUCTION IN COOKERY. A. P. THOMSON. 2s. 6d.

AN INTRODUCTION TO THE STUDY OF TEXTILE DESIGN. By Aldred F. Barker. *Demy 8vo.* 7s. 6d.

BUILDERS' QUANTITIES. By H. C. Grubb. *Cr. 8vo.* 4s. 6d.

RÉPOUSSÉ METAL WORK. By A. C. Horth. *Cr. 8vo.* 2s. 6d.

ELECTRIC LIGHT AND POWER: An Introduction to the Study of Electrical Engineering. By E. E. Brooks, B.Sc. (Lond.). and W. H. N. James, A.R.C.S., A.I.E.E. *Cr. 8vo.* 4s. 6d.

ENGINEERING WORKSHOP PRACTICE. By C. C. Allen. *Cr 8vo.* 3s. 6d.

Handbooks of Theology

THE XXXIX. ARTICLES OF THE CHURCH OF ENGLAND. Edited by E. C. S. Gibson, D.D. *Sixth Edition. Demy 8vo.* 12s. 6d.

AN INTRODUCTION TO THE HISTORY OF RELIGION. By F. B. Jevons. M.A., Litt.D. *Fourth Edition. Demy 8vo.* 10s. 6d.

THE DOCTRINE OF THE INCARNATION. By R. L. Ottley, D.D. *Fourth Edition revised. Demy 8vo.* 12s. 6d.

AN INTRODUCTION TO THE HISTORY OF THE CREEDS. By A. E. Burn, D.D. *Demy 8vo.* 10s. 6d.

THE PHILOSOPHY OF RELIGION IN ENGLAND AND AMERICA. By Alfred Caldecott, D.D. *Demy 8vo.* 10s. 6d.

A HISTORY OF EARLY CHRISTIAN DOCTRINE. By J. F. Bethune-Baker, M.A. *Demy 8vo.* 10s. 6d.

The Westminster Commentaries

General Editor, WALTER LOCK, D.D., Warden of Keble College, Dean Ireland's Professor of Exegesis in the University of Oxford.

THE BOOK OF GENESIS. Edited with Introduction and Notes by S. R. Driver, D.D. *Seventh Edition. Demy 8vo.* 10s. 6d.

THE BOOK OF JOB. Edited by E. C. S. Gibson, D.D. *Second Edition. Demy 8vo.* 6s.

THE ACTS OF THE APOSTLES. Edited by R. B. Rackham, M.A. *Demy 8vo. Fourth Edition.* 10s. 6d.

THE FIRST EPISTLE OF PAUL THE APOSTLE TO THE CORINTHIANS. Edited by H. L. Goudge, M.A. *Second Ed. Demy 8vo.* 6s.

THE EPISTLE OF ST. JAMES. Edited with Introduction and Notes by R. J. Knowling, D.D. *Demy 8vo.* 6s.

THE BOOK OF EZEKIEL. Edited H. A. Redpath, M.A., D.Litt. *Demy 8vo.* 10s. 6d.

A COMMENTARY ON EXODUS. By A. H. M'Neile, B.D. With a Map and 3 Plans. *Demy 8vo.* 10s. 6d.

PART II.—FICTION

Albanesi (E. Maria). SUSANNAH AND ONE OTHER. *Fourth Edition. Cr. 8vo.* 6*s.*
THE BLUNDER OF AN INNOCENT. *Second Edition. Cr. 8vo.* 6*s.*
CAPRICIOUS CAROLINE. *Second Edition. Cr. 8vo.* 6*s.*
LOVE AND LOUISA. *Second Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
PETER, A PARASITE. *Cr. 8vo.* 6*s.*
THE BROWN EYES OF MARY. *Third Edition. Cr. 8vo.* 6*s.*
I KNOW A MAIDEN. *Third Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*

Austen (Jane). PRIDE AND PREJUDICE. *Medium 8vo.* 6*d.*

Bagot (Richard). A ROMAN MYSTERY. *Third Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
THE PASSPORT. *Fourth Edition. Cr. 8vo.* 6*s.*
TEMPTATION. *Fifth Edition. Cr. 8vo.* 6*s.*
LOVE'S PROXY. *A New Edition. Cr. 8vo.* 6*s.*
DONNA DIANA. *Second Edition. Cr. 8vo.* 6*s.*
CASTING OF NETS. *Twelfth Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*

Balfour (Andrew). BY STROKE OF SWORD. *Medium 8vo.* 6*d.*

Baring-Gould (S.). ARMINELL. *Fifth Edition. Cr. 8vo.* 6*s.*
URITH. *Fifth Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
IN THE ROAR OF THE SEA. *Seventh Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
MARGERY OF QUETHER. *Third Edition. Cr. 8vo.* 6*s.*
THE QUEEN OF LOVE. *Fifth Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
JACQUETTA. *Third Edition. Cr. 8vo.* 6*s.*
KITTY ALONE. *Fifth Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
NOÉMI. Illustrated. *Fourth Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
THE BROOM-SQUIRE. Illustrated. *Fifth Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
DARTMOOR IDYLLS. *Cr. 8vo.* 6*s.*
GUAVAS THE TINNER. Illustrated. *Second Edition. Cr. 8vo.* 6*s.*
BLADYS OF THE STEWPONEY. Illustrated. *Second Edition. Cr. 8vo.* 6*s.*
PABO THE PRIEST. *Cr. 8vo.* 6*s.*
WINEFRED. Illustrated. *Second Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
ROYAL GEORGIE. Illustrated. *Cr. 8vo.* 6*s.*
CHRIS OF ALL SORTS. *Cr. 8vo.* 6*s.*
IN DEWISLAND. *Second Ed. Cr. 8vo.* 6*s.*
THE FROBISHERS. *Crown 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
DOMITIA. Illus. *Second Ed. Cr. 8vo.* 6*s.*
MRS. CURGENVEN OF CURGENVEN. *Crown 8vo.* 6*s.*
LITTLE TU'PENNY. *A New Edition. Medium 8vo.* 6*d.*
FURZE BLOOM. *Medium 8vo.* 6*d.*

Barnett (Edith A.). A WILDERNESS WINNER. *Second Edition. Cr. 8vo.* 6*s.*

Barr (James). LAUGHING THROUGH A WILDERNESS. *Cr. 8vo.* 6*s.*

Barr (Robert). IN THE MIDST OF ALARMS. *Third Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
THE COUNTESS TEKLA. *Fourth Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
THE MUTABLE MANY. *Third Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
THE TEMPESTUOUS PETTICOAT. Illustrated. *Third Edition. Cr. 8vo.* 6*s.*
THE STRONG ARM. *Second Edition. Cr. 8vo.* 6*s.*
JENNIE BAXTER JOURNALIST. *Medium 8vo.* 6*d.*

Begbie (Harold). THE CURIOUS AND DIVERTING ADVENTURES OF SIR JOHN SPARROW; or, THE PROGRESS OF AN OPEN MIND. With a Frontispiece. *Second Edition. Cr. 8vo.* 6*s.*

Belloc (Hilaire), M.P. EMMANUEL BURDEN, MERCHANT. With 36 Illustrations by G. K. CHESTERTON. *Second Ed. Cr. 8vo.* 6*s.*

Benson (E. F.) DODO: A DETAIL OF THE DAY. *Fifteenth Edition. Cr. 8vo.* 6*s.* Also *Medium 8vo.* 6*d.*
THE VINTAGE. *Medium 8vo.* 6*d.*

Benson (Margaret). SUBJECT TO VANITY. *Cr. 8vo.* 3*s.* 6*d.*

Birmingham (George A.). THE BAD TIMES. *Second Edition. Crown 8vo.* 6*s.*

Bowles (G. Stewart). A GUN-ROOM DITTY BOX. *Second Ed. Cr. 8vo.* 1*s.* 6*d.*

Bretherton (Ralph Harold). THE MILL. *Cr. 8vo.* 6*s.*

Brontë (Charlotte). SHIRLEY. *Medium 8vo.* 6*d.*

Burke (Barbara). BARBARA GOES TO OXFORD. With 16 Illustrations. *Third Edition. Cr. 8vo.* 6*s.*

Burton (J. Bloundelle). ACROSS THE SALT SEAS. *Medium 8vo.* 6*d.*

Caffyn (Mrs.) ('Iota'). ANNE MAULEVERER. *Medium 8vo.* 6*d.*

Campbell (Mrs. Vere). FERRIBY. *Second Edition. Cr. 8vo.* 6*s.*

Capes (Bernard). THE EXTRAORDINARY CONFESSIONS OF DIANA PLEASE. *Third Edition. Cr. 8vo.* 6s.
A JAY OF ITALY. *Fourth Ed. Cr. 8vo.* 6s.
LOAVES AND FISHES. *Second Edition. Cr. 8vo.* 6s.
A ROGUE'S TRAGEDY. *Second Edition. Cr. 8vo.* 6s.
THE GREAT SKENE MYSTERY. *Second Edition. Cr. 8vo.* 6s.
THE LAKE OF WINE. *Medium 8vo.* 6d.
Carey (Wymond). LOVE THE JUDGE. *Second Edition. Cr. 8vo.* 6s.
Castle (Agnes and Egerton). FLOWER O' THE ORANGE, and Other Tales. With a Frontispiece in Colour by A. H. Buckland. *Third Edition. Cr. 8vo.* 6s.
Charlton (Randal). MAVE. *Second Edition. Cr. 8vo.* 6s.
THE VIRGIN WIDOW. *Cr. 8vo.* 6s.
Chesney (Weatherby). THE TRAGEDY OF THE GREAT EMERALD *Cr. 8vo.* 6s.
THE MYSTERY OF A BUNGALOW. *Second Edition. Cr. 8vo.* 6s.
Clifford (Mrs. W. K.). THE GETTING WELL OF DOROTHY. Illustrated by GORDON BROWNE. *Second Edition. Cr. 8vo.* 3s. 6d.
A FLASH OF SUMMER. *Medium 8vo.* 6d.
MRS. KEITH'S CRIME. *Medium 8vo.* 6d.
Conrad (Joseph). THE SECRET AGENT: A Simple Tale. *Fourth Ed. Cr. 8vo.* 6s.
Corbett (Julian). A BUSINESS IN GREAT WATERS. *Medium 8vo.* 6d.
Corelli (Marie). A ROMANCE OF TWO WORLDS. *Twenty-Ninth Ed. Cr. 8vo.* 6s.
VENDETTA. *Twenty-Sixth Ed. Cr. 8vo.* 6s.
THELMA. *Thirty-Ninth Ed. Cr. 8vo.* 6s.
ARDATH: THE STORY OF A DEAD SELF. *Eighteenth Edition. Cr. 8vo.* 6s.
THE SOUL OF LILITH. *Fifteenth Edition. Cr. 8vo.* 6s.
WORMWOOD. *Sixteenth Ed. Cr. 8vo.* 6s.
BARABBAS: A DREAM OF THE WORLD'S TRAGEDY. *Forty-Third Edition. Cr. 8vo.* 6s.
THE SORROWS OF SATAN. *Fifty-Fourth Edition. Cr. 8vo.* 6s.
THE MASTER CHRISTIAN. *Twelfth Edition. 177th Thousand. Cr. 8vo.* 6s.
TEMPORAL POWER: A STUDY IN SUPREMACY. *150th Thousand. Cr. 8vo.* 6s
GOD'S GOOD MAN: A SIMPLE LOVE STORY. *Thirteenth Edition.* 150th Thousand. *Cr. 8vo.* 6s.
THE MIGHTY ATOM. *Twenty-seventh Edition. Cr. 8vo.* 6s.
BOY: a Sketch. *Tenth Edition. Cr. 8vo.* 6s.
CAMEOS. *Thirteenth Edition. Cr. 8vo.* 6s.
Cotes (Mrs. Everard). See Sara Jeannette Duncan.
Cotterell (Constance). THE VIRGIN AND THE SCALES. Illustrated. *Second Edition. Cr. 8vo.* 6s.
Crockett (S. R.), Author of 'The Raiders,' etc. LOCHINVAR. Illustrated. *Third Edition. Cr. 8vo.* 6s.
THE STANDARD BEARER. *Cr. 8vo.* 6s.
Croker (B. M.). THE OLD CANTONMENT. *Cr. 8vo.* 6s.
JOHANNA. *Second Edition. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
THE HAPPY VALLEY. *Fourth Edition. Cr. 8vo.* 6s.
A NINE DAYS' WONDER. *Third Edition. Cr. 8vo.* 6s.
PEGGY OF THE BARTONS. *Seventh Ed. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
ANGEL. *Fourth Edition. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
A STATE SECRET. *Third Edition. Cr. 8vo.* 3s. 6d. Also *Medium 8vo.* 6d.
Crosbie (Mary). DISCIPLES. *Second Ed. Cr. 8vo.* 6s.
Cuthell (Edith E.). ONLY A GUARD-ROOM DOG. Illustrated by W. PARKINSON. *Crown 8vo.* 3s. 6d.
Dawson (Warrington). THE SCAR *Second Edition. Cr. 8vo.* 6s.
THE SCOURGE *Cr. 8vo.* 6s.
Deakin (Dorothea). THE YOUNG COLUMBINE. With a Frontispiece by LEWIS BAUMER. *Cr. 8vo.* 6s.
Deane (Mary). THE OTHER PAWN. *Cr. 8vo.* 6s.
Doyle (A. Conan). ROUND THE RED LAMP. *Eleventh Edition. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
Dumas (Alexandre). See page 39.
Duncan (Sara Jeannette) (Mrs. Everard Cotes). THOSE DELIGHTFUL AMERICANS. *Medium 8vo.* 6d.
A VOYAGE OF CONSOLATION. Illustrated. *Third Edition. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
Eliot (George). THE MILL ON THE FLOSS. *Medium 8vo.* 6d.
Erskine (Mrs. Steuart). THE MAGIC PLUMES. *Cr. 8vo.* 6s.
Fenn (G. Manville). SYD BELTON; or, The Boy who would not go to Sea. Illustrated by GORDON BROWNE. *Second Ed. Cr. 8vo.* 3s. 6d.
Findlater (J. H.). THE GREEN GRAVES OF BALGOWRIE. *Fifth Edition. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
THE LADDER TO THE STARS. *Second Edition. Cr. 8vo.* 6s.
Findlater (Mary). A NARROW WAY. *Third Edition. Cr. 8vo..* 6s.
OVER THE HILLS. *Cr. 8vo.* 6s.
THE ROSE OF JOY. *Third Edition. Cr. 8vo.* 6s.
A BLIND BIRD'S NEST. With 8 Illustrations. *Second Edition. Cr. 8vo.* 6s.
Fitzpatrick (K.) THE WEANS AT ROWALLAN. Illustrated. *Second Edition. Cr. 8vo.* 6s.
Francis (M. E.). (Mrs. Francis Blundell). STEPPING WESTWARD. *Second Edition. Cr. 8vo.* 6s.
MARGERY O' THE MILL. *Third Edition. Cr. 8vo.* 6s.
Fraser (Mrs. Hugh). THE SLAKING OF THE SWORD. *Second Edition. Cr. 8vo.* 6s.

IN THE SHADOW OF THE LORD. *Third Edition. Crown* 8vo. 6s.

Fry (B. and C.B.). A MOTHER'S SON. *Fifth Edition. Cr.* 8vo. 6s.

Fuller-Maitland (Ella). BLANCHE ESMEAD. *Second Edition. Cr.* 8vo. 6s.

Gallon (Tom). RICKERBY'S FOLLY. *Medium* 8vo. 6d.

Gaskell (Mrs.). CRANFORD. *Medium* 8vo. 6d.

MARY BARTON. *Medium* 8vo. 6d.

NORTH AND SOUTH. *Medium* 8vo. 6d.

Gates (Eleanor). THE PLOW-WOMAN. *Cr.* 8vo. 6s.

Gerard (Dorothea). HOLY MATRIMONY. *Medium* 8vo 6d.

MADE OF MONEY. *Cr.* 8vo. 6s.
Also *Medium* 8vo. 6d.

THE IMPROBABLE IDYL. *Third Edition. Cr.* 8vo. 6s.

THE BRIDGE OF LIFE. *Cr.* 8vo. 6s.

THE CONQUEST OF LONDON. *Medium* 8vo. 6d.

Gissing (George). THE TOWN TRAVELLER. *Second Edition. Cr.* 8vo. 6s.
Also *Medium* 8vo. 6d.

THE CROWN OF LIFE. *Cr.* 8vo. 6s.
Also *Medium* 8vo. 6d.

Glanville (Ernest). THE INCA'S TREASURE. Illustrated. *Cr.* 8vo. 3s. 6d.
Also *Medium* 8vo. 6d.

THE KLOOF BRIDE. Illustrated. *Cr.* 8vo. 3s. 6d. Also *Medium* 8vo. 6d.

Gleig (Charles). BUNTER'S CRUISE. Illustrated. *Cr.* 8vo. 3s. 6d.
Also *Medium* 8vo. 6d.

Grimm (The Brothers). GRIMM'S FAIRY TALES. Illustrated. *Medium* 8vo. 6d.

Hamilton (M.). THE FIRST CLAIM. *Second Edition. Cr.* 8vo. 6s.

Harraden (Beatrice). IN VARYING MOODS. *Fourteenth Edition. Cr.* 8vo. 6s.

THE SCHOLAR'S DAUGHTER. *Fourth Edition. Cr.* 8vo. 6s.

HILDA STRAFFORD and THE REMITTANCE MAN. *Twelfth Ed. Cr.* 8vo. 6s.

Harrod (F.) (Frances Forbes Robertson). THE TAMING OF THE BRUTE. *Cr.* 8vo. 6s.

Herbertson (Agnes G.). PATIENCE DEAN. *Cr.* 8vo. 6s.

Hichens (Robert). THE PROPHET OF BERKELEY SQUARE. *Second Edition. Cr.* 8vo. 6s.

TONGUES OF CONSCIENCE. *Third Edition. Cr.* 8vo. 6s.

FELIX. *Sixth Edition. Cr.* 8vo. 6s.

THE WOMAN WITH THE FAN. *Seventh Edition. Cr.* 8vo. 6s.

BYEWAYS. *Cr.* 8vo. 6s.

THE GARDEN OF ALLAH. *Seventeenth Edition. Cr.* 8vo. 6s.

THE BLACK SPANIEL. *Cr.* 8vo. 6s.

THE CALL OF THE BLOOD. *Seventh Edition. Cr.* 8vo. 6s.

Hope (Anthony). THE GOD IN THE CAR. *Eleventh Edition. Cr.* 8vo. 6s.

A CHANGE OF AIR. *Sixth Ed. Cr.* 8vo. 6s.
Also *Medium* 8vo. 6d.

A MAN OF MARK. *Fifth Ed. Cr.* 8vo. 6s.
Also *Medium* 8vo. 6d.

THE CHRONICLES OF COUNT ANTONIO. *Sixth Edition. Cr.* 8vo. 6s.
Also *Medium* 8vo. 6d.

PHROSO. Illustrated by H. R. MILLAR. *Seventh Edition. Cr.* 8vo. 6s.
Also *Medium* 8vo. 6d.

SIMON DALE. Illustrated. *Eighth Edition. Cr.* 8vo. 6s.

THE KING'S MIRROR. *Fourth Edition. Cr.* 8vo. 6s.

QUISANTE. *Fourth Edition. Cr.* 8vo. 6s.

THE DOLLY DIALOGUES. *Cr.* 8vo. 6s.
Also *Medium* 8vo. 6d.

A SERVANT OF THE PUBLIC. Illustrated. *Fourth Edition. Cr.* 8vo. 6s.

TALES OF TWO PEOPLE. With a Frontispiece by A. H. BUCKLAND. *Third Ed. Cr.* 8vo. 6s.

Hope (Graham). THE LADY OF LYTE. *Second Edition. Cr.* 8vo. 6s.

Hornung (E. W.). DEAD MEN TELL NO TALES. *Medium* 8vo. 6d.

Housman (Clemence). THE LIFE OF SIR AGLOVALE DE GALIS. *Cr.* 8vo. 6s.

Hueffer (Ford Madox). AN ENGLISH GIRL: A ROMANCE. *Second Edition. Cr.* 8vo. 6s.

Hutten (Baroness von). THE HALO. *Fifth Edition. Cr.* 8vo. 6s.

Hyne (C. J. Cutcliffe). MR. HORROCKS, PURSER. *Fourth Edition. Cr.* 8vo. 6s.

PRINCE RUPERT, THE BUCCANEER. Illustrated. *Third Edition. Cr.* 8vo. 6s.

Ingraham (J. H.). THE THRONE OF DAVID. *Medium* 8vo. 6d.

Jacobs (W. W.). MANY CARGOES. *Thirty-first Edition. Cr.* 8vo. 3s. 6d.

SEA URCHINS. *Fifteenth Edition. Cr.* 8vo. 3s. 6d.

A MASTER OF CRAFT. Illustrated by WILL OWEN. *Eighth Edition. Cr.* 8vo. 3s. 6d.

LIGHT FREIGHTS. Illustrated by WILL OWEN and Others. *Seventh Edition. Cr.* 8vo. 3s. 6d.

THE SKIPPER'S WOOING. *Ninth Edition. Cr.* 8vo. 3s. 6d.

AT SUNWICH PORT. Illustrated by WILL OWEN. *Ninth Edition. Cr.* 8vo. 3s. 6d.

DIALSTONE LANE. Illustrated by WILL OWEN. *Seventh Edition. Cr.* 8vo. 3s. 6d.

ODD CRAFT. Illustrated by WILL OWEN. *Seventh Edition. Cr.* 8vo. 3s. 6d.

THE LADY OF THE BARGE. *Eighth Edition. Cr.* 8vo. 3s. 6d.

James (Henry). THE SOFT SIDE. *Second Edition. Cr.* 8vo. 6s.

THE AMBASSADORS. *Second Edition. Cr.* 8vo. 6s.

THE GOLDEN BOWL. *Third Edition. Cr.* 8vo. 6s.

Keays (H. A. Mitchell). HE THAT EATETH BREAD WITH ME. *Cr.* 8vo. 6s.

Kester (Vaughan). THE FORTUNES OF THE LANDRAYS. Illustrated. *Cr. 8vo.* 6s.

Lawless (Hon. Emily). WITH ESSEX IN IRELAND. *Cr. 8vo.* 6s.

Le Queux (William). THE HUNCHBACK OF WESTMINSTER. *Third Ed. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE CROOKED WAY. *Second Edition. Cr. 8vo.* 6s.
THE CLOSED BOOK. *Third Ed. Cr. 8vo.* 6s.
THE VALLEY OF THE SHADOW. Illustrated. *Third Edition. Cr. 8vo.* 6s.
BEHIND THE THRONE. *Third Edition. Cr. 8vo.* 6s.

Levett-Yeats (S. K.). ORRAIN. *Second Edition. Cr. 8vo.* 6s.
THE TRAITOR'S WAY. *Medium 8vo.* 6d.

Linton (E. Lynn). THE TRUE HISTORY OF JOSHUA DAVIDSON. *Medium 8vo.* 6d.

London (Jack). WHITE FANG. With a Frontispiece by CHARLES RIVINGSTON BULL. *Sixth Edition. Cr. 8vo.* 6s.

Lyall (Edna). DERRICK VAUGHAN, NOVELIST. *42nd Thousand. Cr. 8vo.* 3s. 6d. Also *Medium 8vo.* 6d.

Maartens (Maarten). THE NEW RELIGION: A MODERN NOVEL. *Third Edition. Cr. 8vo.* 6s.

M'Carthy (Justin H.). THE LADY OF LOYALTY HOUSE. Illustrated. *Third Edition. Cr. 8vo.* 6s.
THE DRYAD. *Second Edition. Cr. 8vo.* 6s.
THE DUKE'S MOTTO. *Third Edition. Cr. 8vo.* 6s.

Macdonald (Ronald). A HUMAN TRINITY. *Second Edition. Cr. 8vo.* 6s.

Macnaughtan (S.). THE FORTUNE OF CHRISTINA M'NAB. *Fourth Edition. Cr. 8vo.* 6s.

Malet (Lucas). COLONEL ENDERBY'S WIFE. *Fourth Edition. Cr. 8vo.* 6s.
A COUNSEL OF PERFECTION. *New Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE WAGES OF SIN. *Sixteenth Edition. Cr. 8vo.* 6s.
THE CARISSIMA. *Fifth Ed. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE GATELESS BARRIER. *Fifth Edition. Cr. 8vo.* 6s.
THE HISTORY OF SIR RICHARD CALMADY. *Seventh Edition. Cr. 8vo.* 6s.

Mann (Mrs. M. E.). OLIVIA'S SUMMER. *Second Edition. Cr. 8vo.* 6s.
A LOST ESTATE. *A New Ed. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE PARISH OF HILBY. *A New Edition. Cr. 8vo.* 6s.
THE PARISH NURSE. *Fourth Edition. Cr. 8vo.* 6s.
GRAN'MA'S JANE. *Cr. 8vo.* 6s.
MRS. PETER HOWARD. *Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
A WINTER'S TALE. *A New Edition. Cr. 8vo.* 6s.
ONE ANOTHER'S BURDENS. *A New Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
ROSE AT HONEYPOT. *Third Ed. Cr. 8vo.* 6s.
THERE WAS ONCE A PRINCE. Illustrated by M. B. MANN. *Cr. 8vo.* 3s. 6d.
WHEN ARNOLD COMES HOME. Illustrated by M. B. MANN. *Cr. 8vo.* 3s. 6d.
THE EGLAMORE PORTRAITS. *Third Edition. Cr. 8vo.* 6s.
THE MEMORIES OF RONALD LOVE. *Cr. 8vo.* 6s.
THE SHEEP AND THE GOATS. *Third Edition. Cr. 8vo.* 6s.
A SHEAF OF CORN. *Second Edition. Cr. 8vo.* 6s.
THE CEDAR STAR. *Medium 8vo.* 6d.

Marchmont (A. W.). MISER HOADLEY'S SECRET. *Medium 8vo.* 6d.
A MOMENT'S ERROR. *Medium 8vo.* 6d.

Marriott (Charles). GENEVRA. *Second Edition. Cr. 8vo.* 6s.

Marryat (Captain). PETER SIMPLE *Medium 8vo.* 6d.
JACOB FAITHFUL. *Medium 8vo.* 6d.

Marsh (Richard). THE TWICKENHAM PEERAGE. *Second Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE MARQUIS OF PUTNEY. *Second Edition. Cr. 8vo.* 6s.
IN THE SERVICE OF LOVE. *Third. Edition. Cr. 8vo.* 6s.
THE GIRL AND THE MIRACLE. *Third Edition. Cr. 8vo.* 6s.
THE COWARD BEHIND THE CURTAIN. *Cr. 8vo.* 6s.
A METAMORPHOSIS. *Medium 8vo.* 6d.
THE GODDESS. *Medium 8vo.* 6d.
THE JOSS. *Medium 8vo.* 6d.

Marshall (Archibald). MANY JUNES. *Second Edition. Cr. 8vo.* 6s.

Mason (A. E. W.). CLEMENTINA. Illustrated. *Second Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.

Mathers (Helen). HONEY. *Fourth Ed. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
GRIFF OF GRIFFITHSCOURT. *Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
THE FERRYMAN *Second Edition. Cr. 8vo.* 6s.
TALLY-HO! *Fourth Edition. Cr. 8vo.* 6s.
SAM'S SWEETHEART. *Medium 8vo.* 6d.

Maxwell (W. B.). VIVIEN. *Ninth Edition. Cr. 8vo.* 6s.
THE RAGGED MESSENGER. *Third Edition. Cr. 8vo.* 6s.
FABULOUS FANCIES. *Cr. 8vo.* 6s.
THE GUARDED FLAME. *Seventh Edition. Cr. 8vo.* 6s.
ODD LENGTHS. *Second Ed. Cr. 8vo.* 6s.
THE COUNTESS OF MAYBURY: BETWEEN YOU AND I. Being the Intimate Conversations of the Right Hon. the Countess of Maybury. *Fourth Edition. Cr. 8vo.* 6s.

Meade (L. T.). DRIFT. *Second Edition. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
RESURGAM. *Cr. 8vo.* 6s.
VICTORY. *Cr. 8vo.* 6s.
A GIRL OF THE PEOPLE. Illustrated by R. BARNET. *Fourth Ed. Cr. 8vo.* 3s. 6d.
HEPSY GIPSY. Illustrated by E. HOPKINS. *Crown 8vo.* 2s. 6d.
THE HONOURABLE MISS: A STORY OF AN OLD-FASHIONED TOWN. Illustrated by E. HOPKINS. *Second Edition. Crown 8vo.* 3s. 6d.
Melton (R.). CÆSAR'S WIFE. *Second Edition. Cr. 8vo.* 6s.
Meredith (Ellis). HEART OF MY HEART. *Cr. 8vo.* 6s.
Miller (Esther). LIVING LIES. *Third Edition. Cr. 8vo.* 6s.
Mitford (Bertram). THE SIGN OF THE SPIDER. Illustrated. *Sixth Edition. Cr. 8vo.* 3s. 6d. Also *Medium 8vo.* 6d.
IN THE WHIRL OF THE RISING. *Third Edition. Cr. 8vo.* 6s.
THE RED DERELICT. *Second Edition. Cr. 8vo.* 6s.
Molesworth (Mrs.). THE RED GRANGE. Illustrated by GORDON BROWNE. *Second Edition. Cr. 8vo.* 3s. 6d.
Montgomery (K. L.). COLONEL KATE. *Third Edition. Cr. 8vo.* 6s.
Montresor (F. F.). THE ALIEN. *Third Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
Morrison (Arthur). TALES OF MEAN STREETS. *Seventh Edition. Cr. 8vo.* 6s.
A CHILD OF THE JAGO. *Fifth Edition. Cr. 8vo.* 6s.
THE HOLE IN THE WALL. *Fourth Edition. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
TO LONDON TOWN. *Second Ed. Cr. 8vo.* 6s.
DIVERS VANITIES. *Cr. 8vo.* 6s.
Nesbit (E.). (Mrs. H. Bland). THE RED HOUSE. Illustrated. *Fourth Edition. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
Norris (W. E.). HARRY AND URSULA: A STORY WITH TWO SIDES TO IT. *Second Edition. Cr. 8vo.* 6s.
HIS GRACE. *Medium 8vo.* 6d.
GILES INGILBY. *Medium 8vo.* 6d.
THE CREDIT OF THE COUNTY. *Medium 8vo.* 6d.
LORD LEONARD THE LUCKLESS. *Medium 8vo.* 6d.
MATTHEW AUSTIN. *Medium 8vo.* 6d.
CLARISSA FURIOSA. *Medium 8vo.* 6d.
Oliphant (Mrs.). THE LADY'S WALK. *Medium 8vo.* 6d.
SIR ROBERT'S FORTUNE. *Medium 8vo.* 6d.
THE PRODIGALS. *Medium 8vo.* 6d.
THE TWO MARYS. *Medium 8vo.* 6d.
Ollivant (Alfred). OWD BOB, THE GREY DOG OF KENMUIR. With a Frontispiece. *Eleventh Ed. Cr. 8vo.* 6s.
Oppenheim (E. Phillips). MASTER OF MEN. *Fourth Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
Oxenham (John). A WEAVER OF WEBS. With 8 Illustrations by MAURICE GREIFFENHAGEN. *Fourth Edition. Cr. 8vo.* 6s.
THE GATE OF THE DESERT. With a Frontispiece in Photogravure by HAROLD COPPING. *Fifth Edition. Cr. 8vo.* 6s.
PROFIT AND LOSS. With a Frontispiece in photogravure by HAROLD COPPING. *Fourth Edition. Cr. 8vo.* 6s.
THE LONG ROAD. With a Frontispiece in Photogravure by HAROLD COPPING. *Fourth Edition, Cr. 8vo.* 6s.
Pain (Barry). LINDLEY KAYS. *Third Edition. Cr. 8vo.* 6s.
Parker (Gilbert). PIERRE AND HIS PEOPLE. *Sixth Edition. Cr. 8vo.* 6s.
MRS. FALCHION. *Fifth Edition. Cr. 8vo.* 6s.
THE TRANSLATION OF A SAVAGE. *Third Edition. Cr. 8vo.* 6s.
THE TRAIL OF THE SWORD. Illustrated. *Tenth Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
WHEN VALMOND CAME TO PONTIAC: The Story of a Lost Napoleon. *Sixth Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
AN ADVENTURER OF THE NORTH. The Last Adventures of 'Pretty Pierre.' *Fourth Edition. Cr. 8vo.* 6s.
THE SEATS OF THE MIGHTY. Illustrated. *Sixteenth Edition. Cr. 8vo.* 6s.
THE BATTLE OF THE STRONG: a Romance of Two Kingdoms. Illustrated. *Sixth Edition. Cr. 8vo.* 6s.
THE POMP OF THE LAVILETTES. *Third Edition. Cr. 8vo.* 3s. 6d.
Also *Medium 8vo.* 6d.
Pemberton (Max). THE FOOTSTEPS OF A THRONE. Illustrated. *Third Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
I CROWN THEE KING. With Illustrations by Frank Dadd and A. Forrestier. *Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
Phillpotts (Eden). LYING PROPHETS. *Third Edition. Cr. 8vo.* 6s.
CHILDREN OF THE MIST. *Fifth Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE HUMAN BOY. With a Frontispiece. *Sixth Edition. Cr. 8vo.* 6s
Also *Medium 8vo.* 6d.
SONS OF THE MORNING. *Second Edition. Cr. 8vo.* 6s.
THE RIVER. *Third Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE AMERICAN PRISONER. *Fourth Edition. Cr. 8vo.* 6s.
THE SECRET WOMAN. *Fourth Edition. Cr. 8vo.* 6s.
KNOCK AT A VENTURE. With a Frontispiece. *Third Edition. Cr. 8vo.* 6s.
THE PORTREEVE. *Fourth Ed. Cr. 8vo.* 6s.
THE POACHER'S WIFE. *Second Edition Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.

THE STRIKING HOURS. *Second Edition. Crown 8vo.* 6s.
THE FOLK AFIELD. *Crown 8vo.* 6s.
Pickthall (Marmaduke). SAID THE FISHERMAN. *Seventh Ed. Cr. 8vo.* 6s.
BRENDLE. *Second Edition. Cr. 8vo.* 6s.
THE HOUSE OF ISLAM. *Third Edition. Cr. 8vo.* 6s.
'Q' (A. T. Quiller Couch). THE WHITE WOLF. *Second Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE MAYOR OF TROY. *Fourth Edition. Cr. 8vo.* 6s.
MERRY-GARDEN AND OTHER STORIES. *Cr. 8vo.* 6s.
MAJOR VIGOUREUX. *Third Edition. Cr. 8vo.* 6s.
Rawson (Maud Stepney). THE ENCHANTED GARDEN. *Fourth Edition. Cr. 8vo.* 6s.
Rhys (Grace). THE WOOING OF SHEILA. *Second Edition. Cr. 8vo.* 6s.
Ridge (W. Pett). LOST PROPERTY. *Medium 8vo.* 6d.
ERB. *Second Edition. Cr. 8vo.* 6s.
A SON OF THE STATE. *Second Edition. Cr. 8vo.* 3s. 6d. Also *Medium 8vo.* 6d.
A BREAKER OF LAWS. *A New Edition. Cr. 8vo.* 3s. 6d.
MRS. GALER'S BUSINESS. Illustrated. *Second Edition. Cr. 8vo.* 6s.
THE WICKHAMSES. *Fourth Edition. Cr. 8vo.* 6s.
NAME OF GARLAND. *Third Edition. Cr. 8vo.* 6s.
GEORGE and THE GENERAL. *Medium 8vo.* 6d.
Ritchie (Mrs. David G.). MAN AND THE CASSOCK. *Second Edition. Crown 8vo.* 6s.
Roberts (C. G. D.). THE HEART OF THE ANCIENT WOOD. *Cr. 8vo.* 3s. 6d.
Robins (Elizabeth). THE CONVERT. *Third Edition. Cr. 8vo.* 6s.
Rosenkrantz (Baron Palle). THE MAGISTRATE'S OWN CASE. *Cr. 8vo.* 6s.
Russell (W. Clark). MY DANISH SWEETHEART. Illustrated. *Fifth Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
HIS ISLAND PRINCESS. Illustrated. *Second Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
ABANDONED. *Second Edition. Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
MASTER ROCKAFELLAR'S VOYAGE. Illustrated by GORDON BROWNE. *Third Edition. Cr. 8vo.* 3s. 6d.
A MARRIAGE AT SEA. *Medium 8vo.* 6d.
Ryan (Marah Ellis). FOR THE SOUL OF RAFAEL. *Cr. 8vo.* 6s.
Sergeant (Adeline). THE MYSTERY OF THE MOAT. *Second Edition. Cr. 8vo.* 6s.
THE PASSION OF PAUL MARILLIER. *Crown 8vo.* 6s.
THE QUEST OF GEOFFREY DARRELL. *Cr. 8vo.* 6s.
THE COMING OF THE RANDOLPHS. *Cr. 8vo.* 6s.
THE PROGRESS OF RACHAEL. *Cr. 8vo.* 6s.
BARBARA'S MONEY. *Cr. 8vo.* 6s.
Also *Medium 8vo.* 6d.
THE MASTER OF BEECHWOOD. *Medium 8vo.* 6d.
THE YELLOW DIAMOND. *Second Ed. Cr. 8vo.* 6s. Also *Medium 8vo.* 6d.
THE LOVE THAT OVERCAME. *Medium 8vo.* 6d.
Shannon (W. F.). THE MESS DECK. *Cr. 8vo.* 3s. 6d.
Shelley (Bertha). ENDERBY. *Third Ed. Cr. 8vo.* 6s.
Sidgwick (Mrs. Alfred). THE KINSMAN. With 8 Illustrations by C. E. BROCK. *Third Edition. Cr. 8vo.* 6s.
Smith (Dorothy V. Horace). MISS MONA. *Cr. 8vo.* 3s. 6d.
Sonnichsen (Albert). DEEP-SEA VAGABONDS. *Cr. 8vo.* 6s.
Sunbury (George). THE HA'PENNY MILLIONAIRE. *Cr. 8vo.* 3s. 6d.
Surtees (R. S.). HANDLEY CROSS. Illustrated. *Medium 8vo.* 6d.
MR. SPONGE'S SPORTING TOUR. Illustrated. *Medium 8vo.* 6d.
ASK MAMMA. Illus. *Medium 8vo.* 6d.
Urquhart (M.), A TRAGEDY IN COMMONPLACE. *Second Ed. Cr. 8vo.* 6s.
Vorst (Marie Van). THE SENTIMENTAL ADVENTURES OF JIMMY BULSTRODE. *Cr. 8vo.* 6s.
Waineman (Paul). THE BAY OF LILACS: A Romance from Finland. *Second Edition. Cr. 8vo.* 6s.
THE SONG OF THE FOREST. *Cr. 8vo.* 6s.
Walford (Mrs. L. B.). MR. SMITH. *Medium 8vo.* 6d.
THE BABY'S GRANDMOTHER. *Medium 8vo.* 6d.
COUSINS. *Medium 8vo.* 6d.
Wallace (General Lew). BEN-HUR. *Medium 8vo.* 6d.
THE FAIR GOD. *Medium 8vo.* 6d.
Watson (H. B. Marriott). CAPTAIN FORTUNE. *Third Edition. Cr. 8vo.* 6s.
TWISTED EGLANTINE. With 8 Illustrations by FRANK CRAIG. *Third Edition. Cr. 8vo.* 6s.
THE HIGH TOBY: Being further Chapters in the Life and Fortunes of Dick Ryder, otherwise Galloping Dick, sometime Gentleman of the Road. With a Frontispiece by CLAUDE SHEPPERSON. *Third Edition. Cr. 8vo.* 6s.
A MIDSUMMER DAY'S DREAM. *Third Edition. Crown 8vo.* 6s.